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FACULTY OF EDUCATION
The University of Alberta

Request for Information from The Canada Council's Consultative Committee on the Individual, Language and Society

The Canada Council, advised by the Development Committee of its Academic Panel, has established a Consultative Committee on the Individual, Language and Society.

Among the areas of concern of this Committee will be the emotional and cognitive consequences of second language acquisition, bi- and multi-language facility, minority ethnic status, acculturation and deculturation. Broadly speaking, the focus is on:

- A. Linguistic studies with a social component
- B. Psychological studies with a language component
- C. Social studies with a language component

The Committee is charged with assessing the state of research in the area, identifying gaps in that research and making recommendations to the Canada Council about ways of filling these gaps.

A critical aspect of the Committee's work is to identify all scholars in Canada who are working in the area of the Committee's concern. One approach is to solicit information through notices in publications such as this.

We ask scholars whose research bears on the terms-of-reference of the Committee to write to:

Dr. W. H. Coons, Chairman,
Consultative Committee on the
Individual, Language and Society,
Department of Psychology,
York University,
Downsview, Ontario,
M3J 1P3.

It would be appreciated if each respondent would indicate his research interests, problems he has encountered in the conduct of his work (including financial problems), fields of study in need of special attention, the names of others working in the area, and anything else which he thinks the Committee should consider.

(français sur page 278)

M. S. RATTAN

Red Deer College

The Role of Language, Manipulation and Demonstration in the Acquisition, Retention, and Transfer of Conservation

A stratified sample of grade one non-conservers (N=90) was randomly assigned to four experimental groups and one control group in a study designed to investigate the roles of language, manipulation, and demonstration in the acquisition, retention, and transfer of conservation tasks including two dimensional space, number, substance, continuous quantity, weight, discontinuous quantity, area and length. Analysis of the data found support for the following: (1) the concept of conservation is not only acquired by non-conservers, but is also retained over five week periods and is transferred to other conservation tasks some of which are generally regarded as being acquired at a much later stage; (2) direct activity and observation learning are equally effective for inducing cognitive changes leading to the criteria; (3) high degree of verbalization is significantly better than low degree of verbalization under both direct activity and observation learning.

Piaget's theory of intellectual development relies heavily on direct activity and spontaneous experience in explaining the formation and development of cognitive structures. The theory starts from the central postulate that motor action is the source from which mental operations emerge. "The action of the organism is central to the acquisition of the operations (i.e. ideas or strategies) which we require for coping with the world" (Tuddenham, 1966). It would appear also that Piaget is not primarily interested in the possible effects of specific, deliberate didactic tuition of mental processes (Piaget, 1970). In fact, as Sinclair-de-Zwart (1969) has stated, Piaget de-emphasizes the role of language to the point where it is not even considered as a necessary condition for the constitution of concrete operations—the operations that underlie the presence of conservation skills. (When a child is able to conserve he realizes that certain properties—quantity, number, etc., remain invariant in the face of certain transformations, e.g., changing the object's form or shape.)

Bruner (1966), Gagné (1964), Blank and Solomon (1968), Kagan (1966), Kendler (1964), generally stress the importance of verbal mediation in cognitive development. They suggest that language (verbal mediators) provides a means, not only for representing experience, but also for transforming it.

Once the child has succeeded in internalizing language as a cognitive instrument, it becomes possible for him to represent and systematically transform the regularities of experience with far greater flexibility and power than before (Bruner, 1964, p. 4).

Developments in Soviet psychology have also pointed out the importance of language as a system of controls on various types of problem solving activities in children (Vygotsky, 1962; Luria, 1969; Sokolov, 1959). The Soviet view-point is summarized by Sokolov as follows:

... speech emerges not only as the means of expression of thought, but primarily as the means of their formation, the means of analysis and synthesis, abstraction and generalization of material reality, and the material of logic operations is constituted by all of these sense (felt and perceived) data of material reality (Sokolov, 1959, p. 669).

The importance of modelling to the acquisition of behavior has been pointed out by Bandura and Walters (1963). Luria and Yudovich (1959), too, assign considerable importance to adult models and language in the acquisition of higher mental processes. The American and Soviet psychologists generally stress the importance of verbal mediation in cognitive development, and place less emphasis on direct activity on the part of the child vis-a-vis his material environment. The position taken here does not deny the role of action in thought, nor does it assert the role of language unrelated to action (whether actually carried out, or observed or imagined). It emphasizes that language begins to give direction, articulation, and mobility to that action as soon as the child begins to actively acquire a grasp on the instrumentality of language, i.e., at an age prior to the onset of concrete operations.

Piaget considers conservation as a pivotal construct in the child's transition from the pre-operational to the operational stage. A number of investigations (Sigel, Roeper & Hooper, 1966; Lefrançois, 1966; Carlson, 1967; Gelman, 1967; Coté, 1968; Brainerd and Allen, 1971; Goldschmid and Lovell, 1971; Sullivan and Brison, 1967; Goldschmid, 1968) have suggested that the child's acquisition of conservation can be accelerated by special training. These studies, however, have not concerned themselves with a range of conservation tasks but have dealt only with isolated aspects of the concept such as conservation of substance and so on. A considerable number of intervention studies have not attempted to satisfy Piaget's (1964) criteria of stability and generalizability of the acquired concept. Further, there is no conclusive evidence (Carlson, 1967; Sonstroem, 1966) as to the relative importance of physical activity (manipulation) as contrasted with observation learning in accelerating transition from the pre-operational to the operational stage.

The present investigation addresses itself to the problems that are identified in the above discussion. The major purpose of the study is an attempt to clarify some of the issues involved in the theoretical controversy that exists between Piagetian and American-Soviet positions. The testing is done in terms of the acquisition of the concept of invariance embodying conservation of two dimensional space, number, substance, continuous quantity, weight, discon-

tinuous quantity, length and area. The research design of the study includes the investigation of stability and generalizability of the acquired concept. More specifically, the purpose of the study is to determine:

- (1) the role of experimental treatments in the acquisition, retention, and transfer of the concept of conservation;
- (2) the role of direct activity (manipulation or transformation of objects by the subjects themselves), as contrasted with observation learning (didactic verbal instruction in which materials are manipulated by the experimenter) in the acquisition, retention and transfer of the concept of conservation;
- (3) the role of two degrees of verbalization (in connection with both direct activity and observation learning) in the cognitive re-organization leading to the acquisition, retention and transfer of the concept of conservation.

Method

Sample

The subjects, taken from a stratified sample pool of grade one non-conservers ($N = 90$), were randomly assigned to four experimental and one control group. To be included in the final sample from the original sample tested ($N = 160$), a subject had to (a) pass the relational terms test indicating his comprehension of the relational terms "as much", "not as much", and "more"—the three phrases used in the Concept Assessment Kit; (b) fail the pre-test on conservation of substance—the classical test with plasticine balls [96% of the final sample ($N = 90$) had zero scores for both behavior and explanation]; (c) score between the 10th and 90th percentile on the *Raven's Colored Progressive Matrices Test* (1947); and (d) come from an English-speaking home. Sample distribution by sex, SES, mental ability, age, and experimental conditions is indicated in Table 1. One way analysis of variance showed that the five groups were the same with respect to average age, average ability level, and average socioeconomic status (Blisshen's S.E.I. for occupations, 1967).

TABLE 1
SAMPLE DISTRIBUTION BY SEX, SES, MENTAL ABILITY (RPM),
AGE, AND EXPERIMENTAL CONDITIONS

	Experimental Conditions				
	High Verbal Demonstration I	Low Verbal Demonstration II	High Verbal Manipulation III	Low Verbal Manipulation IV	Control V
N	18	18	18	18	18
Sex	F	9	11	11	3
	M	9	7	7	15
SES	$\bar{X}$	43.17	44.44	44.00	43.63
	SD	12.20	15.46	13.99	12.27
RPM	$\bar{X}$	20.17	20.78	21.33	20.50
	SD	2.88	2.60	3.03	3.20
Age	$\bar{X}$	82.89	83.11	80.89	82.11
	SD	2.85	2.93	2.76	3.09

Experimental Procedures

The procedures used in the study were developed and refined by the author in the course of a pilot study. The experimental *Ss* were trained individually on three tasks: two dimensional space, substance, and discontinuous quantity. Each *S* was given two fifteen-minute training sessions spread over two days. There were nine trials in each session and none of the manipulations forming part of the three criterion scales were included in the training trials.

Experimental Condition 1. This was a high verbal demonstration (HVD) condition. *E*'s focus was to demonstrate that the original quantity (in the conservation tasks) of material remained invariant no matter how the object's shape was transformed. The *E* performed a series of transformations including some involving addition or subtraction. The latter manipulations were performed in order to avoid generating a response set in the *S*, i.e., "they are always the same." More specifically, the following sequence of events took place in this experimental condition.

1. *S*'s agreement with respect to the quantitative equivalence of two objects was secured.
2. The *S* was told to watch carefully while *E* performed a series of transformations.
3. With each transformation meaningful labels were either elicited or provided or both, i.e., "you see, it is longer this way but shorter this way," or again, "it is flatter but thinner," etc.
4. After each transformation, the *S* was asked, "Now tell me, is there as much wood/clay/corn *here* (pointing to the non-changed shape) as *there* (pointing to the transformed shape) or does one have more?" (*Q*).
5. The response of the *S* was reinforced with knowledge of results (i.e., "yes, that is right" or "no, that is wrong").
6. The *S* was told to watch carefully while *E* changed the transformed shape back to its original shape and repeated the *Q* (see #4 above).
7. The response of the *S* was again reinforced with the knowledge of results (see #5 above).
8. After sequence numbers 5 and 7, the *E* provided verbal rules using appropriate syntactical structures to emphasize quantitative invariance [e.g., "it is the same amount because nothing was added or nothing was taken away," or "it looks different but really it is the same amount because we can change it back to its original shape" (while performing the inverse operation), or again, "it is more or less because a little piece was added or taken away."]

The above sequence of events was followed for each of 18 trials in the two training sessions.

Experimental Condition 2. This was a Low Verbal Demonstration (LVD) condition and the same sequence of events was followed as under condition 1, except *E* did not go beyond giving the positive or negative reinforcement (i.e., sequence 8 was omitted).

Experimental Condition 3. This was a High Verbal Direct Activity (manipulation) Condition (HVM). The general procedure was the same as under Experimental Condition 1, except the *S* was told to carry out the described transformations himself.

Experimental Condition 4. This was a Low Verbal Manipulation condition (LVM). The general procedure was the same as under Experimental Condition 2, except the S was told to carry out the described transformations himself.

Experimental Condition 5. This was the condition that was applied to the control group. Each S in the control group received one brief (about 10 to 12 minutes) irrelevant training session. This was done to counteract a possible Hawthorne effect and to help establish good rapport between the S and E.

After the Ss were assigned to their experimental conditions, a schedule was drawn up so that each S would have an equal amount of elapsed time between the first instructional session and the following meetings between the S and E. This was done to control time factor which is undoubtedly important to cognitive reorganization leading to the acceptance of mathematical invariance.

Criterion Measures

The criterion measures used in the study were the three conservation scales A, B, and C of the Concept Assessment Kit (Goldschmid and Bentler, 1968). Test administration and scoring was done according to the instructions given in the manual, and only the last two parts of two-dimensional space and continuous quantity were included for Forms A and B of the kit.

Post Test 1. Conservation Scale A was administered one day after the second training session. The scale has six items dealing with the conservation of two-dimensional space, number, substance, continuous quantity, weight, and discontinuous quantity.

Post Test 2. Conservation Scale B was administered five weeks after the training. This scale is parallel to Scale A and includes the same six items.

Transfer Test. Conservation Scale C was administered approximately six weeks after the training and one week after Post Test 2. This scale has two items dealing with the conservation of area and length.

The variables Acquisition and Retention represent the total scores for two-dimensional space, substance, and discontinuous quantity—the training tasks for the experimental groups. The variables Transfer 1 (Post Test 1) and Transfer 2 (Post Test 2) represent the total scores for the conservation of number, continuous quantity, and weight. The variable Total involves the total of both conservation behavior and conservation explanation for the tasks in each of the three Criterion scales—Post Test 1, Post Test 2, and Transfer Test.

Results

Hypothesis 1: Overall effect, stability, and transfer of training

Table 2 presents means and standard deviations on the seven criterion measures for each of the five experimental conditions. Analysis of variance indicates that experimental treatment affects significantly ($p < .005$) the performance on each of the seven variables. Further analysis, using Neuman Keuls comparisons (Winer, 1962), reveals that the experimental groups outperformed significantly ($p < .01$) the control group on Post Test 1 Acquisition, Post Test 1 Transfer, Post Test 1 Total, Post Test 2 Retention, Post Test 2 Transfer, Post Test 2 Total, and Transfer Test Total variables.

It is quite clear that effects of training are responsible not only for acquisition of a broad range of conservation but also for retention (over a five week period) and transfer—both specific (Forms A and B) and general (Form C). The results appear to meet the high criteria set by Piaget (1964) for acknowledging genuine conservation and acceleration.

TABLE 2
MEANS AND STANDARD DEVIATIONS FOR THE SEVEN CRITERION
VARIABLES FOR EACH OF THE EXPERIMENTAL CONDITIONS

Variable		HVD	LVD	HVM	LVM	Control
Post Test 1 Acquisition	$\bar{X}$	5.94	4.17	5.89	4.39	1.39
	S.D.	.24	1.54	.32	1.46	2.17
Post Test 1 Transfer	$\bar{X}$	5.22	3.67	4.44	4.11	1.28
	S.D.	.88	1.65	1.34	1.53	2.05
Post Test 1 Total	$\bar{X}$	11.17	7.83	10.33	8.50	2.67
	S.D.	.99	3.01	1.57	2.85	4.16
Post Test 2 Retention	$\bar{X}$	5.94	4.61	5.61	3.72	1.33
	S.D.	.24	1.72	.98	1.27	2.11
Post Test 2 Transfer	$\bar{X}$	5.44	3.67	5.06	3.44	1.33
	S.D.	.72	1.37	1.55	1.25	1.85
Post Test 2 Total	$\bar{X}$	11.33	8.28	10.67	7.17	2.67
	S.D.	1.03	2.72	2.14	2.38	3.88
Transfer Test	$\bar{X}$	8.50	6.17	7.56	6.22	2.89
	S.D.	2.83	3.42	3.43	2.67	3.69

Hypothesis 2: Differences in results of manipulation and demonstration training under two levels of verbalization

The differences between Manipulation and Demonstration means on the seven variables are not significant under high and low verbal conditions. Further, Manipulation and Demonstration training are equally effective in inducing a broad range of conservation skills whether we use Bruner's criteria or Piaget's criteria.

Hypothesis 3: Differences in results of high verbal and low verbal training under two types of activity

The Newmen-Keuls comparisons for differences between High Verbal Demonstration and Low Verbal Demonstration indicate that differences favoring high verbal conditions are significant for Acquisition ($p < .01$), Transfer 1 ($p < .05$), Post Test 1 Total ($p < .01$), Retention ($p < .05$), Transfer 2 ($p < .01$), and Post Test 2 Total ($p < .01$). Similar comparisons for differences between High Verbal Manipulation and Low Verbal Manipulation indicate that differences favoring the high verbal condition are significant for Acquisition ($p < .01$), and Post Test 2 Total ($p < .01$). Similar comparisons for differences between Test 2 Total ($p < .01$). Thus, there is strong support for the hypothesis of the superiority of verbal mediation in the acquisition, retention, and transfer of a range of conservation skills.

Discussion

The results of the present study clearly support the position that appropriate training can facilitate basic cognitive processes leading to the acquisition, retention, and transfer (Piaget's criteria, 1964) of a range of conservation tasks. Thus, Piaget's position, that explains cognitive re-organization leading to the acquisition of conservation skills only or mostly in terms of spontaneous and incidental experience of the child, must be questioned. The reluctance of Piagetians to accept the effects of specific training procedures which may influence the individual's developmental transitions from one stage to another may well be due to the possibility that they have not considered other training techniques "outside the scope of both passive empiricism and the equilibration theory" (Kohnstamm, 1966).

The results of the present study also challenge the position of those who are strong advocates of either direct experimentation or demonstration, as one technique may be just as good as the other depending, perhaps, on the type of concept to be taught, and the age of the child.

What turns out to be more important than type of activity, for the Ss in this study, is the level of verbalization in the experimental treatments. The high verbal didactic instruction in conjunction with either type of activity (i.e., direct experience or demonstration) shows significant superiority over low verbal instruction in inducing the acquisition, retention and transfer of conservation. However, if we accept conservation behavior without logical explanations (Bruner's criteria, 1966), the differences between high and low verbal instruction groups disappear. It could be concluded that verbal instruction only provides a handy rule which the children could give, and thereby be judged as conservers. This interpretation would appear to be false, however, if one considers the possibility that a concept can exist at different levels of sophistication. It is not unreasonable to claim that high verbal instruction develops a deeper and more sophisticated conception of conservation as the Ss become aware of the logical necessity of the conservation responses. The findings of no difference of behavior scores indicates that the Ss realize the logical necessity of the conservation responses, but do not have a fully developed concept of invariance. This is not to say that the Ss have only a "pseudo-concept"—as Piagetians would have us to believe. They appear to have the concept, though at a less sophisticated level. These results support the view that concept formation or conceptual development is not an all or none affair, but that levels of understanding and sophistication exist and these should be recognized by research workers.

The experimental findings of the study seem to question the contention by Inhelder *et al.* (1966) that "language is not enough to markedly affect cognitive structures", as it would appear that language training (supplying the S with verbal rules and potential mediators) can bring about cognitive re-organization leading to the acceptance of conservation. Thus, Piaget's position, that the conservation concept is acquired from physical action and that language becomes important only after cognitive re-organization has occurred, must be challenged.

The exact role that language plays in cognitive development is difficult to discern. Perhaps the better performance of the verbal didactic instruction groups is due to the fact that verbal instruction orients the child's thinking to

the relevant features of the stimulus and/or that it provides a model or rule for processing relevant input data; the child then is released from "the overpowering appearance of visual display" and can operate at the level of symbolic representation. The present study generally supports the work done by Soviet psychologists such as Luria and Vygotsky, and American psychologists such as Bruner and Kendler in underscoring the importance and relevancy of the verbal mediation model for enhancing cognitive processes. However, it is recognized that the role of language vis-a-vis activity in cognitive development may be stronger for Ss who come from homes and cultures that stress the instrumentality of language from a very early age. Thus, to throw more light on the role of language in cognitive development, a study or studies could be designed to test the hypotheses of this study in relation to the child's preferred modes of perceiving and thinking—the modes that can be determined by studying the mother-child interaction (Schmidt, 1969; Brady, 1968; Hess & Shipman, 1962; Bernstein, 1961) either in the same or different socio-cultural groups. For example, it may be hypothesized that youngsters who have strong action orientation rather than strong language orientation may learn conservation skills better through a method that emphasizes manipulation training. However, as Blank and Solomon (1968), suggest, even for these youngsters the verbal mediation hypothesis may still hold; techniques utilizing relevant verbalization may develop language skills necessary for abstract thinking in conservation problems.

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Teacher Quality Perceptions and Achievement in Rajasthan

Social Studies Achievement test scores of 804 tenth-grade Indian students were regressed on their ratings of their teachers, IQ scores, sociometric nominations, socioeconomic status, sex, and school characteristics plus several product terms and quadratic forms of the variables. The resulting six-term regression model was cross-subject validated on 452 Science students. The analysis suggests that IQ and the teacher rating can each be divided into two parts, the class mean and the individual student's deviation from it, both of which are related to individual learning. (Dr. Walberg is Professor of Human Development and Learning at the University of Illinois at Chicago Circle; Dr. Singh is Director of the Jialal Institute of Education, Ajmer, Rajasthan.)

Two series of studies of national samples of physics classes showed that student ratings of the social environment of their classes provide incremental validity beyond that obtained by IQ and pretests in predicting cognitive and affective posttests (see reviews by Walberg, 1971; Randhawa & Fu, 1973; Khan & Weiss, 1973). Recently the incremental validity of the instrument used, the *Learning Environment Inventory* (LEI), has been shown in eight other secondary school subjects offered in Montreal (Walberg & Anderson, 1972). The LEI requires the student to describe his class by agreeing or disagreeing with descriptive statements such as "The students look forward to coming to class," and LEI scores are functions of both student and teacher characteristics. The present study employs an LEI-based instrument in Hindi that requires the student to agree or disagree with direct statements describing his teacher rather than his class.

In past work with the LEI, it was considered necessary to carry out separate analysis on both class-mean and individual scores on IQ, LEI, pretests and posttests. While the important relations between LEI and learning have been found generally parallel in the two forms of analysis, it is conceivable that correlations and regression weights could differ in sign as well as magnitude in future research. The two forms of analysis answer different questions. Economists and sociologists who deal with aggregate data point out that

regressions of variables at national, state, census tract, and individual levels can produce quite different results, and the proper level of aggregation is not always clear. Analysis of class means affords independent units of observation to meet the assumption of statistical inference (students within a class interact and affect one another's learning, and hence their scores are correlated, not independent). But analysis of means also ignores individual variation within classes that is of theoretical interest to psychologists and of practical concern to educators. Analysis of individual scores across classes depicts the individual variation but does not disentangle class-mean effects. Because the two forms of analysis have different theoretical implications for research on teaching, a simultaneous analysis is proposed and carried out here that assesses the relative weights of individual scores and class means on IQ and LEI in the prediction of individual learning.

Method

Sample

There are 26 school districts and 437 Higher Secondary Schools in the State of Rajasthan (of course, no generalization of the results beyond the population sampled should be statistically inferred). Lists of boys' and girls' schools within each of the district were prepared, and schools of each kind were randomly selected from each district. Schools in five districts along India's border that were closed during the India-Pakistan War in 1972 had to be omitted from the sampling. In each school a tenth-grade social studies or a science class was tested or, in larger schools, classes in both subjects that did not overlap in student membership were tested. In the 41 schools in which tests were administered, complete data were available in 56 classes totaling 804 social studies and 452 science students with a mean age of 15 years. During the test administration, the following categorizations were made for each school: location—rural or urban; type—public or private; and sex—boys' or girls'.

Instruments

The instrument used to measure teacher effectiveness from the student point of view consists of 120 statements in Hindi describing the teacher such as: "The teacher is pleased with us", "The teacher pays attention to every student", "The teacher presents his ideas in a clear manner". The student checks one of five options: Never, Sometimes, Often, Most of the time, and Always. There are eight scales—Emotional Warmth, Accepting, Adaptable, Emotional Relationship, Fairness, Trust, Status, and Communication—each consisting of 15 items, and they vary in internal-consistency reliability from .71 to .87 for the present sample. A principal components analysis and varimax rotation showed that one large factor accounts for 82 percent of the variance in the subscales. Hence the sum of the scales was employed in the analysis and was termed "Quality".

Three sociometric nominations were obtained from each child on 10 scales—Aggressive Behavior, Rapt Attention, Manipulating Others, Sharing and Helping, Negative Attention Getting, Following Directions, Withdrawal, Respect, Response to Internal Stimuli, and Social Interaction; the scales vary in internal consistency from .44 to .88. Principal components with varimax analysis revealed two factors labelled "Studiousness" and "Mischievousness", that account for 75 percent of the variance in the scales.

A socioeconomic status (SES) questionnaire and intelligence test were completed by all students. On the questionnaire there are spaces for family income, parental education, and occupation. A standard weighting scheme was employed to calculate the index for each student. The 20-minute IQ test consists of 100 short items on number series, deduction, vocabulary, synonyms and antonyms, analogies, and general knowledge. Its internal consistency for a large sample of Rajasthan secondary students is .94.

The 100-item achievement tests in Hindi are standardized and geared to the standard curriculum of Rajasthan Higher Secondary Schools. Two sample items translated from Hindi are: "From the point of view of raw material, which place is most suitable for establishing a sugar factory: Ajmer, Bombay, Lucknow, or Kanpur?" and "Which is the best method for protection from cholera: Vaccination, Inoculation, or Saline Injection?" The internal consistencies of the Social Studies and Science tests are respectively .67 and .81.

All instruments were administered during the middle part of the school year (December and January) by one of authors (R.S.) and in a few cases by one of his students who had been trained to assist in the research. No particular difficulties were observed, and the students appeared to be fully cooperative during the administration procedure.

Variable Transformations

The class means (M) and standard deviations were calculated for IQ, rated Teacher Quality, and Socioeconomic Status and punched on IBM cards for each student along with his individual scores. The univariate and bivariate statistics for the primary variables for analysis are shown in Tables 1 and 2.

TABLE 1
UNIVARIATE STATISTICS

	Social Studies		Science	
	M	SD	M	SD
Achievement	30.387	9.193	30.279	10.551
IQ _M	91.334	8.177	93.174	9.056
Quality _M	398.861	28.241	394.219	33.043
IQ _D	.005	13.889	-.008	12.630
Quality _D	.004	67.946	.007	69.400
Studiousness	22.792	26.181	22.549	24.227
Mischievousness	14.845	20.061	14.177	19.466

Analysis

An *a priori* ordering of the independent variables among and within sets was established for regression analysis as follows:

- A. IQ, SES, and Quality class means (M)
- B. IQ, SES, and Quality class standard deviations

TABLE 2
CORRELATION MATRICES

	Ach.	IQ _M	Q1 _M	IQ _D	Q1 _D	Stud.	Mis.
Achievement		087	163	229	549	429	-364
IQ _M	269		149	000	000	026	-045
Quality _M	291	469		000	000	083	001
IQ _D	360	000	000		243	179	-085
Quality _D	545	000	000	469		365	-405
Studiousness	557	068	103	328	103		-095
Mischievousness	-361	-114	-108	-156	-462	-216	

Note: Correlations for Science classes are below the diagonal; those for Social Studies are above the diagonal; decimal points omitted.

C. Cross-products of IQ, SES, and Quality class means

D. Sex, Type, Location (each in the form of dummy—0 or 1— values), and Number in the class.

E. Cross-products of IQ, SES and Quality (M) with Sex, Type, Location, and Number in Class

F. IQ, SES, and Quality individual deviations from the class mean (D) plus individual Sociometric Scores

G. Cross-products among IQ, SES, Quality (D), and Sociometric Scores

H. Cross-products of Sex, Type, Location, and Number in Class with IQ, SES, Quality (D), and Sociometric Scores.

A multiple regression was programmed to scan the sets and variables within sets in the order indicated. Any variable that would not reduce the error variance significantly (probability less than .05) after higher priority variables were scanned (and either entered in the equation or eliminated depending on their significance) was eliminated from the analysis. The analysis was run on Social Studies students; and after the equations were estimated using the above procedure, residuals were calculated (by subtracting the predicted values from the observed values) and computer-plotted in scattergrams against the independent variables to check for any linear relations undetected in the regression and non-linear relations.

Results and Discussion

No variable in sets B, C, D, E, G, and H entered the regression, and only the variables from sets A and F listed in Table 3 contributed to the prediction of achievement. The results imply that:

- A. Among the class-mean values, IQ and Quality are significantly (probability less than .05) related to Social Studies Achievement; mean SES is not related to Achievement independent of mean IQ and Quality; mean Quality is related to Achievement independent of mean IQ.

TABLE 3
ACHIEVEMENT REGRESSION ANALYSES

	Social Studies			Science		
	R Increment	Raw Weight	Standard Error	R Increment	Raw Weight	Standard Error
IQ _M	.087***	.057	.031	.269***	.181***	.043
Quality _M	.088***	.044***	.009	.058***	.057***	.012
IQ _D	.113***	.053**	.019	.159***	.151***	.029
Quality _D	.297***	.049***	.004	.195***	.049***	.006
Studiosness	.040***	.088***	.010	.040***	.126***	.017
Mischievousness	.022***	-.084***	.013	.003	-.045*	.020
Total R	.647***			.725***		
Cross-Subject R	.621			.702		
Criterion- attenuation corrected R	.759			.780		

* p = .05
** p = .01
*** p = .001

The results further imply that, independent of variables entered during prior steps in each case:

- B. The standard deviations of IQ, SES, and Quality are not related to Achievement; these results replicate the frequent finding that students in heterogeneous and homogeneous IQ and SES groups do not differ in measured Achievement.
- C. Mean IQ, SES and Quality do not interact in their relation to Achievement; in particular, the relation of mean Quality to Achievement does not differ significantly across class levels of IQ and SES.
- D. Sex, Type, Location and Number of students in the class are not related to Achievement independent of mean IQ and Quality; in particular, these results replicate the frequent finding that class size is unrelated to measured Achievement.
- E. The relations of mean IQ and Quality to Achievement do not differ across boys' and girls', public and private, and rural and urban schools or in classes of different sizes.
- F. The Deviation variables (individual value minus the class mean) for IQ and Quality are related to Achievement; SES deviation is not related to Achievement; Studiosness and Mischievousness are related to learning.
- G. Deviation IQ and Quality do not interact in their relation to Achievement.

- H. Deviation IQ, Quality, and SES do not interact in their relation to Achievement with Sex, Type, Location and Number; in particular, the relation of Quality to Achievement does not differ in boys' and girls', public and private, and rural and urban schools or in different size classes.

When the prediction of Science Achievement was calculated from the Social Studies regression weights, it produced a cross-subject validation of .702 (Table 3). This cross-subject validation for Science is higher than the original R for Social Studies because the variance of Science Achievement is 31.7 percent higher than that of Social Studies achievement; the Science test as noted earlier is more reliable; and the patterns of correlations among independent and dependent variables differ somewhat for the two subjects (Table 2).

In the final analysis, the screened six-term regression was calculated for Science students and put to a cross-subject validation on Social Studies students. The original R for Social Studies is .647, and the cross-subject R is .621 (Table 3). Thus, as shrinkage equations for few variables relative to the number of cases would suggest, the cross-subject R's are nearly as high as the original R's. When the cross-subject R's are corrected for criterion-unreliability attenuation, the R's for Social Studies and Science Achievement are about the same, .759 and .780, respectively (Table 3). Corrections for unreliability of the independent variables would raise the R's substantially higher but methods of estimating reliabilities of the deviations have not been devised.

Table 3 shows that the mean and deviation measures of Quality receive roughly equal weights in the regression; however, the deviation weight is undoubtedly under-estimated since the deviation score is less reliable because the reliable class-mean variance is subtracted from it. The weights suggest what might be termed "optimization"—high rating of the teacher by the class associated with high levels of learning on the average—and "individualization"—a relatively higher rating (than the mean-class rating) given by an individual student associated with his high levels of learning. From a comparison of Quality means and deviation weights, individualization (teacher-student matching) appears to be somewhat more conducive to learning than optimization (teacher-class matching). Moreover, the significant weights on the sociometric measures, Studiousness and Mischievousness, reveal student-class matching is also associated with higher levels of learning. The analysis demonstrates complexities in the learning process in its natural, social setting that cannot be revealed by analysis of either class means or individual scores. Clearly more exploration of the analytic technique and rating scales are needed to test the generality of the relations shown here as well as to reveal the characteristics of teachers, classes, and students that produce the most suitable social matches for learning.

To conclude on a statistical point, it may appear that the degree of freedom for mean and deviation regression weights should be the number of classes rather than the number of students. Using these fewer degrees of freedom in the present research does not change the significance levels, however, because the difference in t values (for the ratio of raw weights to their standard errors) on 50 degrees of freedom and an infinite number are small. What does remain unresolved is the independent-units-of-analysis assumption that is obviously violated in this and much other work by psychometrists, economists, and

sociologists who analyze unaggregated individual units from collectives such as student test scores across universities, individual incomes across different countries, and social class of families across urban areas.

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Cognitive Complexity as a Determinant of Information Processing

Relationships between cognitive complexity as defined by the ITI [Interpersonal Topical Inventory (Tuckman, 1966)] and the CST [Conceptual Systems Test (Harvey, 1967)] and a number of other information processing variables were examined using 107 grade eleven students. Generally, characteristics of impulsivity, flexibility, and conformity were associated with ITI functioning, whereas a number of religious orientations were found to be associated only with CST functioning. Two conclusions appear to be derived from this summary: (a) the ITI and CST are assessing conceptual systems functioning differently, and (b) no necessary relationship exists between their domains of functioning. The latter suggestion would appear to be of particular relevance, as it implies that a disparity rather than a difference exists between at least these two psychometric approaches to systems functioning. Further investigators in the area might be wise to select instruments relevant to the particular theoretical formulation they prefer to adopt. (Dr. Stewin is Associate Professor in the Department of Educational Psychology, and Dr. Anderson is Professor in the same department at the University of Alberta.)

Since their joint publication defining "conceptual systems theory", Harvey and Hunt appear to have concentrated on training agents (environmental conditions) and behaviors characteristic of each conceptual system level (Harvey, 1967; Harvey, Prather, White & Hoffmeister, 1968; Hunt, 1966; Hunt & Joyce, 1967), whereas Schroder and others have adopted an information processing approach to conceptual systems functioning (Schroder, Driver & Streufert, 1967; Streufert & Streufert, 1969; Bryson & Driver, 1972). These differing emphases in research have resulted in the development of distinct classificatory schema. In both models, however, the individual is ascribed a position along a concrete-abstract continuum and is presumed to possess a number of personal and conceptual attributes associated with his information processing style.

For example, Harvey's model might be summarized as follows:

System I individuals are concrete, intolerant of ambiguity, categorical, dependent on external concepts, on authority, on the norms of their immediate social environ-

ment, etc. Fixation at the stage of negative independence (System II) results in a strong differentiation between the self and the social environment, leading to the rejection of others and moving away from their influence. The development of empathy during the third stage (System III) results in return of affiliative tendencies, while the attainment of the final stage of development (System IV) results in a balance of affiliative and independent tendencies. (Zajonc, 1968, pp. 334-335.)

Schroder *et al.* (1967, pp. 14-29) prefer to describe individuals in terms of higher and lower integrative structures. A high integrative index is associated with more degrees of freedom in the integrative process, less certainty, and the ability to generate and apply laws in organizing large bodies of information. Behavioral patterns generated by a high integrative index include a theoretical outlook, greater capacity to deal with diversity, greater discrimination, and increasing potential for generation of new schemata without new external conditions.

The present study was designed to examine the relevance of these models to a number of information processing variables proposed by Uznadze (1966), Allport and Ross (1967), Kagan (Kagan, Pearson & Welch, 1966; Yando & Kagan, 1968), and Couch and Keniston (1960).

Set. Set as defined by Uznadze (1966) refers to a readiness to perceive an object in a certain way which is a function of immediately preceding perceptions. Parallel to the effect of conceptual systems functioning, set would appear to exercise a controlling influence on information processing activities.

In the present study, set was established in the haptic modality by presenting the blindfolded subject with two unequal spheres (Uznadze, 1966). The subject was requested to grasp the spheres momentarily and to relate their comparative dimensionality. Following a predetermined number of setting trials, two equal spheres were presented (critical test). Most subjects continued to perceive the spheres as unequal (set illusion) for varying numbers of critical tests, and stated that the original spheres had been interchanged. Critical tests were presented either until the subject had acquired adequate perception (dynamic set) or the maximum number of extinction trials had been presented (static set).

Attaining veridical perception appears closely related to flexibility (Coté, 1968) in the acceptance and integration of relevant sensory stimuli. Therefore one would anticipate that individuals of higher integrative index, being more flexible, would tend to exhibit dynamic sets and should require fewer trials to fixate sets and to extinguish fixed sets than individuals of lower integrative index.

Religious Orientation. Allport and Ross (1967) have suggested that overt religious dependency may be associated with both intrinsic and extrinsic religious orientation. Intrinsic religious dependency is associated with the belief system of the individual whereas extrinsic religious dependency is more representative of social acquiescence in the form of religious conformity.

System I individuals (Harvey, Hunt & Schroder, 1961), being highly reliant on authority and religion, would be expected to be intrinsically religious whereas System III individuals, being oriented toward intragroup control, would be expected to be extrinsically religious. Both Systems I and III would be expected to exhibit higher church attendance than subjects in other systems (Harvey, 1966).

As lower conceptual systems functioning has been associated with categorical thinking (Adams, Harvey & Heslin, 1966; Ware & Harvey, 1967), it was also suggested that System I individuals would exhibit a tendency toward indiscriminately pro-religious thought or a tendency to express agreement with religious stimuli regardless of content (Allport & Ross, 1967).

Impulsivity-Reflectivity. Extensive research into response time or latency has been conducted by Kagan (1965a, 1965b, 1965c, 1966; Kagan, Pearson & Welch, 1966; Yando & Kagan, 1968). Kagan noted that subjects varied in both latency and error scores on a visual discrimination task and described their approaches as either impulsive or reflective. Kagan, Rosman, Day, Albert and Phillips (1964) hypothesized that the latency period may be a reflection of the number of alternatives considered by the individual before responding.

Sieber and Lanzetta (1964, 1966) have suggested that subjects with more complex conceptual structures require both more time and more information before reaching a decision than do less complex individuals. Ware and Harvey (1967) found individuals of lower conceptual systems more likely to form generalized opinions without complete information, which again implies that less complex individuals tend to make decisions quickly. These statements suggest that higher conceptual systems functioning would tend to be related to reflectivity whereas lower functioning would be related to impulsivity.

Agreement Response Set. Differences in information processing have also been defined by Couch and Keniston (1960) using a measure of agreement response set. Emotional acceptance, exhibited by the "yeasayer", would appear related to System I functioning, whereas emotional rejection, characteristic of the "naysayer", appears associated with System II functioning. Schroder, Driver and Streufert (1967, pp. 130-34) lend some support to this suggestion, noting a significant relationship between acquiescence and integrative simplicity (Hunt, 1962) and between overgeneralized negativity and concrete structure (Streufert, 1966).

Method

Instruments used in the study are described below. The sample was composed of 54 male and 53 female grade eleven students ($\bar{CA} = 17.2$ years) randomly selected from a rural composite high school. Group test administration was conducted in one 2-hour session; individual test administration required less than 1 hour per subject.

Complexity Measures. The *Interpersonal Topical Inventory* (ITI) and the *Conceptual Systems Test* (CST) were chosen as measures of complexity in this study on the basis of their objectivity and ease of scoring. The ITI (Tuckman, 1966) consists of 36 forced choice situations, each permitting the assignment of a complexity level score for that item. Each subject obtains four raw scores, designating the number of choices made pertaining to each system. Intrasystem choices are converted to decile points derived by Tuckman (1966) and conceptual system membership is assigned on the basis of maximum decile rank. Subjects obtaining equivalent ranks in multiple systems are unclassifiable.

The CST is an objective measure of conceptual level derived from actual subject responses to the TIB (*This I Believe Test*, Harvey, 1964, 1965). The subject is required to respond to 49 statements on a Likert scale, indicating his

degree of acceptance or rejection of that statement. Factor analysis of the CST has yielded a number of factors “. . . theoretically consistent with the major characteristics of the four principal belief systems posited by Harvey and others (1961)” (Harvey *et al.*, 1968, p. 156). Items loading on each CST factor have been identified, forming subscales pertaining to each factor. The CST is scored to yield six mean subscale scores; subjects are then classified into systems in accordance with cutting points on the CST profile (Harvey, 1967).

Correlates of Complexity Measures. Administration of the haptic set task has been previously described. Data obtained consisted of trials to set fixation, trials to set extinction, and type of set (dynamic or static).

Religious orientation was assessed on the 20 item *Religious Orientation Scale* (ROS), devised by Allport and Ross (1967). Intrinsic responses are low in value, extrinsic responses are high. Medians for both intrinsic and extrinsic scales are obtained and subjects are classified on this basis. Subjects scoring above both medians are termed extrinsic; subjects scoring below medians are termed intrinsic. Individuals who obtain a difference score of -12 or less (12 points less on the intrinsic than the extrinsic subscale) are designated as indiscriminately pro-religious (IPR). A score of this magnitude indicates that the individual records at least 50 per cent more intrinsic choices than would be predicted from his extrinsic choices (Allport & Ross, 1967, p. 438). An indication of frequency of church attendance is also obtained from item 12 of the ROS.

The *Matching Familiar Figures Test* (MFF—Adult Version), devised by Yando and Kagan to evaluate impulsivity-reflectivity, consists of twelve visual matching situations. The subject is simultaneously presented with a standard and eight alternates and is requested to choose the alternate which replicates the standard. A response latency score between presentation of the situation and initial response to one alternate is obtained to the nearest half second. If response errors occur, the subject is informed he is incorrect and requested to continue responding until the correct alternate is selected. Initial latency scores and total error scores per item are summed to yield total scores for the test. Medians in latency and errors for the group are obtained and subjects are classified on a dual basis. Subjects above the median in latency and below the median in errors are termed reflective; subjects below the median in latency and above the median in errors are termed impulsive. Remaining subjects are unclassifiable.

The *Agreement Response Scale* (ARS), devised by Couch and Keniston (1960), measures the tendency of the subject to agree or disagree with statements irrespective of their particular content (agreement response set). The ARS consists of 19 items, 12 of which exhibit high positive loadings on the ARS dimension; the remaining 7 exhibit high negative loadings. Response values are summed to yield a total ARS score.

Analysis and Results

Product-moment correlations were computed between the 12 variables. The 12 x 12 matrix of intercorrelations (Table 1) was factor analyzed by the principal axis method (Harman, 1967). Four eigenvalues greater than one were obtained. The unrotated factor matrix, with the communalities of the variables, is

presented in Table 2. Sums of squares of the loadings for each factor are given, as well as the percentage of common variance and the percentage of total variance accounted for by each factor. The four factors extracted, rotated to simple structure by the varimax method, are presented in Table 3. Loadings exceeding $\pm .300$ on the rotated factors have been interpreted.

TABLE 1
INTERCORRELATIONS BETWEEN COMPLEXITY MEASURES AND CORRELATES

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Conceptual Systems Test (CST)	1.000											
2. Interpersonal Topical Inventory (ITI)	-.000*	1.000										
3. Agreement Response Set	.014	-.020	1.000									
4. Latency (MFF)	.112	.022	.054	1.000								
5. Errors (MFF)	-.007	-.192	-.017	-.584	1.000							
6. Excitation (Set)	-.095	.060	.070	-.110	.085	1.000						
7. Extinction (Set)	.041	-.112	-.106	-.203	.371	-.023	1.000					
8. Dynamism (Set)	.031	.100	.081	.259	-.451	.044	-.841	1.000				
9. ROS-Intrinsic Subscale	.505	-.259	.172	-.135	.207	-.053	.082	-.045	1.000			
10. ROS- Extrinsic Subscale	.005	-.147	.265	-.042	.163	.025	-.053	.116	.292	1.000		
11. ROS-Indiscriminately Pro-Religious	-.310	.062	.036	-.131	.028	.040	-.096	.134	-.410	.204	1.000	
12. ROS-Church Attendance	.344	-.096	.161	-.040	.031	-.020	-.059	.081	.698	.152	-.346	1.000

* All decimal points omitted except in diagonal.

Factor I

Factor I, which accounted for 31.23 percent of the common variance and 19.74 percent of the total variance, was defined by the following loadings:

Test	Loading
Dynamism of set	.899
Extinction trials	-.867
MFF Errors	-.657
MFF Latency	.432
ITI	.326

Characteristics reflected on this factor are high dynamism (flexibility) of set accomplished in few extinction trials, low MFF errors, moderately high MFF latency, and a tendency toward higher complexity as measured by the ITI. This factor was identified as one of flexibility. Highest loadings were obtained on dynamism or flexibility of set, and Kagan’s (1966) construct of reflectivity, defined by low MFF errors in conjunction with high MFF latency. A tendency toward low error scores is again observed in the loading indicating few trials to

set extinction, where five consecutive accurate perceptions are required before set is considered extinguished.

This factor would appear best described as one of flexibility associated with the dimensionality and discrimination qualities of higher complexity. Flexibility may be conceived of as the mechanism allowing the admission of relevant novel stimuli in achieving dynamism of set and the generation and consideration of alternatives necessary to establish a reflective style.

TABLE 2
UNROTATED PRINCIPAL AXES FACTOR LOADINGS

Variables	Factor Loadings				Communality
	I	II	III	IV	
1. Conceptual Systems Test (CST)	410*	502	-294	092	515
2. Interpersonal Topical Inventory (ITI)	-354	-026	-165	531	436
3. Agreement Response Set	074	287	457	-149	319
4. Latency (MFF)	-418	430	-378	-411	671
5. Errors (MFF)	618	-457	329	144	719
6. Excitation (Set)	-036	-095	290	624	484
7. Extinction (Set)	580	-575	-275	-183	777
8. Dynamism (Set)	-584	631	275	148	835
9. ROS-Intrinsic Subscale	741	549	088	032	860
10. ROS-Extrinsic Subscale	193	206	693	-312	658
11. ROS-Indiscriminately Pro-Religious	-417	-361	542	-156	623
12. ROS-Church Attendance	529	618	043	167	691
Sums of Squares	2.575	2.321	1.591	1.099	7.587
% of Common Variance	33.94	30.59	20.98	14.49	100.00
% of Total Variance	21.46	19.34	13.16	9.16	63.22

* All decimal points have been omitted.

TABLE 3
ROTATED FACTOR LOADINGS (VARIMAX)

Variables	Factor Loadings				Communality
	I	II	III	IV	
1. Conceptual Systems Test (CST)	027	707	-.051	-.107	515
2. Interpersonal Topical Inventory (ITI)	326	-.084	-.470	319	436
3. Agreement Response Set	170	075	532	039	319
4. Latency (MFF)	432	038	-.129	-.682	671
5. Errors (MFF)	-.657	030	253	472	719
6. Excitation (Set)	143	-.036	-.072	676	484
7. Extinction (Set)	-.867	032	-.137	-.067	777
8. Dynamism (Set)	899	-.004	163	023	835
9. ROS-Intrinsic Subscale	-.133	830	388	064	860
10. ROS-Extrinsic Subscale	029	-.006	809	049	658
11. ROS-Indiscriminately Pro-Religious	093	-.704	316	138	623
12. ROS-Church Attendance	085	780	252	108	691
Sums of Squares	2.369	2.309	1.606	1.303	7.587
% of Common Variance	31.23	30.43	21.17	17.17	100.00
% of Total Variance	19.74	19.24	13.38	10.86	63.22

All decimal points have been omitted.

Factor II

Factor II, which accounted for 30.43 percent of the common variance and 19.24 percent of the total variance, was defined by the following loadings:

Test	Loading
Intrinsic ROS	.830
ROS Church Attendance	.780
CST	.707
IPR	-.704

These loadings describe a factor associated with high rejection of intrinsic religious statements (religious dogma), low church attendance, higher complexity as measured by the CST, and a general negative attitude toward

religious stimuli. This factor was identified as a religious rejection factor, particularly concerning intrinsic beliefs and behaviors, and is associated with higher conceptual systems functioning. The CST as a measure of systems functioning would appear highly grounded in a religious context, reflecting Harvey's (1966, pp. 48-49) orientation towards the importance of religious beliefs in conceptual systems classification. The loadings obtained on this factor are consonant with Harvey's (1966, p. 49) generalized conclusion that both System II and IV tend to disassociate from religious beliefs and participations, but that System IV members tended to exhibit less negativism toward religion than did System II individuals. In contrast to the religious rejection characteristic of lower systems functioning (System II), this factor may be associated with religious independence characteristic of higher functioning (System IV).

Factor III

Factor III, described by the following loadings, accounted for 21.17 percent of the common variance and 13.38 percent of the total variance:

<i>Test</i>	<i>Loading</i>
Extrinsic ROS	.809
ARS	.532
ITI	-.470
Intrinsic ROS	.388
IPR	.316

Factor III is defined by high agreement with extrinsic religious items, moderate agreement response set, lower complexity as measured by the ITI, low rejection of intrinsic religious items, and a tendency toward IPR responses. These loadings suggest a factor of acquiescence in both religious and social spheres, coupled with lower complexity.

Loadings on this factor suggest high acceptance of the utility of religion in conjunction with mild rejection of religious beliefs. In this instance, the tendency toward IPR response patterns may be viewed as an indication of social conformity rather than an indiscriminate acceptance of religious stimuli. This suggestion is commensurate with both lower conceptual systems functioning and social acquiescence. Couch and Keniston (1960) suggest that high agreement response set is associated with extroversion and lack of internalization of standards, reflected in the Extrinsic and Intrinsic ROS values observed on this factor.

Factor IV

Factor IV, which accounted for 17.17 percent of the common variance and 10.86 percent of the total variance was defined by loadings of:

<i>Test</i>	<i>Loading</i>
MFF Latency	-.682
Excitation Trials	-.676
MFF Errors	.472
ITI	.319

This factor, through its loadings of low MFF latency and moderately high MFF errors, would appear to be identified as an impulsivity factor in Kagan's (1966) terminology. Impulsivity is here accompanied by high trials to set excitation and by a tendency toward higher complexity as measured by the ITI.

Campbell (1968) noted that impulsive subjects do not condition well, however, the finding of a tendency towards complexity on a factor of impulsivity is contrary to expectations. Tuckman (1966) suggested that the ITI appeared to misclassify a number of System I individuals into System III, leaving the marginal complexity loading obtained on the present factor subject to question. The factor appears to be best identified as one of impulsivity.

An alternate interpretation of this loading is derived from Kagan's (1966) suggestion that impulsivity may be indicative of minimal concern for errors. Harvey, Hunt, and Schroder (1961, p. 229) note that praise from the task administrator appears to be of greater value to System III individuals than does task success. Impulsivity, in this context, is consonant with higher (System III) ITI complexity.

As mentioned previously, the CST and ITI were included in the battery on the basis of their objectivity and ease of scoring. It is relevant to note, in connection with the negative results of this aspect of the study, that a correlation of -.00 was obtained between the CST and ITI in the present study. Bower (1969, p. 69), using the CST and short form of the ITI (Gardiner, 1968, p. 115), calculated a correlation of .087 between these measures. It appears that these instruments are assessing conceptual systems functioning in distinct domains.

Discussion

The finding of orthogonality between the CST and the ITI necessitates a more intensive investigation of the psychometric aspects of conceptual systems functioning and a more intensive examination of the theoretical positions from which varied instruments emanate. Problems of measurement have previously been noted by Bower (1969), Streufert and Driver (1967), Streufert (1970), Vannoy (1965), Wiggins (1968), and Zajonc (1968).

Several theorists and researchers in the area, although not always in complete agreement, have described conceptual systems levels in terms of cognitive and behavioural characteristics associated with various systems (Cross, 1967; Harvey, 1966; Harvey, Hunt & Schroder, 1961; Hunt, 1966; Schroder *et al.*, 1967; Wolfe, 1963). Harvey (1967) appears to emphasize the religious orientations of his subjects in defining conceptual systems levels while Schroder (1967) has stressed information processing in his approach to conceptual systems functioning. These differences in approach are clearly reflected in instrumentation. Within the present study, characteristics of impulsivity, flexibility and conformity were associated with ITI functioning, whereas a number of religious orientations were found to be associated only with CST functioning. It is suggested that further research into conceptual systems functioning must closely examine the available instruments.

Wiggins (1968), in his review of research in the area, has strongly suggested that the factor analytic technique, rather than the "one-shot" investigation, appears the most advantageous approach in applying presently available instruments to determining the nature of the complexity variable. As noted

earlier, little commonality has been observed when various measures of complexity have been jointly administered, implying that this construct may be domain specific rather than being a global trait. An efficacious approach to the problem of classification might encompass the administration of a battery of complexity and conceptual systems measures and the derivation of a multidimensional scoring system to effect systems classification. A more comprehensive and unitary theoretical formulation than is presently apparent will evolve only as greater amounts of empirically derived evidence differentiating between systems functioning becomes available. In this regard, the present study was concerned with examining the relationships between conceptual systems functioning and a number of other variables in an attempt to ascribe particular modes of functioning to differing systems.

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The Reading Factor in Measuring Security in Children

The influence of reading comprehension on security measured by the Institute of Child Study Security Test (The Jimmy Story) was investigated. Twenty-five grade 4 to 8 boys diagnosed as emotionally disturbed (assumed to be insecure) were individually matched on age, grade placement, non-language IQ and socioeconomic status with boys rated secure by their teachers. The ICS Security Test and Dominion Achievement Test in Silent Reading were administered to both groups. Analysis of security scores with reading scores as a covariate indicated reading comprehension did not invalidate the security measure. (Dr. Brockman is Associate Professor of Human Development in the Faculty of Home Economics, The University of Manitoba.)

Reading difficulties manifested by children in the classroom raise many questions for the teacher and the school psychologist. Does the reading problem derive from sensory-perceptual deficiencies (Gibson, 1969; Czunder & Rourke, 1972), or from inadequate development of basic reading skills which then may become complicated by decreased motivation to learn the required skills? Such deficiencies may well lead to the child feeling anxious and insecure regarding his reading activity. On the other hand, a child who enters school with an emotional problem or feeling basically insecure in his interpersonal relations may fail to learn the basic reading skills or may learn them less effectively. The teacher, therefore, is required to identify a child's difficulties before he becomes a problem child. This is especially important, as lack of awareness of the child's needs and competence, which would allow for appropriate instruction, is the primary in-school cause of insecurity (Stauffer, 1969).

To assist the teacher in recognizing one type of problem child, Grapko (1957) designed the *Institute of Child Study Security Test (ICS Security Test)*. Its purpose is to measure the personal security and consistency of behaviour of children in grades 4 to 8. For the *ICS Security Test*, developed on the basis of Blatz' Theory of Security (1944), Grapko specifically defined security as "the ability to complete an activity and the willingness to accept one's own decisions, actions, and consequences in the performance of an activity" (1957,

p. 4). He described five levels or degrees of security. (a) The lowest level, insecurity, describes a child who is unable to decide and unwilling to accept the consequences of his actions. (b) The level designated Deputy Agent describes the child who avoids accepting the consequences of his actions by resorting to defense mechanisms of excuse, blame, or denial. (c) The immaturely dependent child seeks help in making a decision, and support in accepting consequences. (d) The maturely dependent child is willing to accept the outcome of his actions provided he can share such responsibilities with a peer. (e) A child who can make up his mind, act on his decision, and accept the outcome willingly is independently secure.

The *ICS Security Test (The Jimmy Story)* is organized around fifteen situations in the school day of an ordinary youngster named Jimmy. It assumes that the child being tested will identify with Jimmy and, in so doing, project his own personal reactions to each problem situation in which he finds Jimmy. The child responds by ranking five possible solutions, each of which represents one of the five levels of security.

From these rankings two measures of the child's test performance are obtained: (a) a *security score* which reflects the degree a child's behaviour agrees with the ideal type of secure behaviour, and (b) a *consistency score* which indicates the degree of uniformity the child shows in ranking the statements at the same level of security. The raw consistency and security scores, ranging from 0 to 100, are transformed into percentile scores following the norms provided in the test manual. Because the mean scores of the normative sample differed significantly between the older (grades 6, 7, and 8) and the younger children (grades 4 and 5) and between girls and boys, four sets of percentile norms were provided.

Three independent validity measures are reported for the *ICS Security Test* (Grapko, 1957). Face validity of the test items and their alternatives indicated an average agreement of 71% among nine staff members and 87% among six teams of five members each of third year university students. Construct validity, suggested by the correlations of security ratings of teachers of grades 4 to 8 with their pupils' security scores ranged from .013 to .175 (p is NS) for grades 6 and 7 children and from .194 ($p < .05$) to .498 ($p < .01$) for grades 4 and 5 children. Similar correlations with consistency scores ranged from .072 (p is NS) to .298 ($p < .05$) for grades 6 and 7 children and from .289 ($p < .01$) for grades 4 and 5 children. As a criterion measure the *California Test of Personality* correlated with grade 5 *ICS Security* scores at .254 ($p < .01$).

However, the fact that the *ICS Security Test* requires the child to read the episodes and five alternative solutions silently and without assistance from the teacher raises a further question in regard to its validity. This question is particularly relevant among grades 4 to 8 children for whom it is assumed that the basic reading skills have already been acquired. If, for some reason other than security, a child has failed to acquire reading skills by grade 4, will he score at a low level of security on Grapko's test?

For this study it was assumed that grades 4 to 8 children, who had been referred to therapy by their respective school personnel because of emotional problems, were insecure. If they scored low on Grapko's *ICS Security Test* and equal to children with no emotional problems on a reading achievement test, then the security score could not be regarded as confounded by a silent reading factor.

Method

Subjects

An experimental and control group of 25 boys each who regularly attended school in grades 4 to 8 were selected for the study. The experimental group had been diagnosed by psychologists as emotionally disturbed and attended weekly therapy sessions at the time of testing. The control group, selected from regular classrooms of the same school systems, were individually matched with the experimental Ss in respect to: (a) attendance in either Public or Separate Schools, (b) grade placement, (c) non-language IQ, and (d) socioeconomic background. Insecure Ss were eliminated from the control group on the basis of the teacher's judgement of the security level of each. Boys who were physically handicapped and/or in whose home a language other than English was spoken were also eliminated from the sample.

Tests

The *Non-Language Multi-Mental Test* of Terman, McCall, and Lorge (1942) provided an appraisal of intelligence by means of pictorial symbols. It has been standardized for children in grades 3 through 8 on a sample of 2500 children representative of elementary schools, differences in socioeconomic backgrounds, and average intelligence. The reliability of the test is .86 for Form A and .90 for Form B.

Socioeconomic background, determined according to the "Index of Status Characteristics" of William Lloyd Warner (1957), considered four factors: occupation of the wage earner in the family, source of income of the wage earner, type of house, and dwelling area in which the ratee lived. Descriptions of house types and dwelling areas appropriate to the geographic area were obtained from quality ratings outlined by town planning consultants who had done a comprehensive survey of the city two years previous to this study.

The *Dominion Achievement Test in Silent Reading* (*Dominion Reading Test*), employed to access the variable factor, is a diagnostic test in paragraph reading "designed to measure achievement in silent reading." It has been standardized on approximately 7000 pupils from the geographic area in which the study was done. The internal consistency estimates of reliability are .858 for Form A and .843 for Form B.

To ensure proper selection of Ss as controls, teachers were provided with the definition of security underlying the *ICS Security Test* together with descriptions and examples of the five levels of security as outlined in the test manual. On a five-point scale the teacher indicated his estimate of the chosen S's security as he observed it (a) in the classroom and (b) on the playground. Children who were rated in the lower two levels of security, Deputy Agent or insecurity, were not included in the control sample. Seventy percent of the control Ss were rated in the highest two levels of security. Six months after the original judgement a verbal re-estimate of the security level of the control Ss by different teachers who were also familiar with the children, confirmed the initial ratings in all cases.

Testing

Prior to testing, matching with regard to Public or Separate School, grade placement, IQ, father's income and occupation was possible from information

obtained from clinical files and school records. Matching on type of house and dwelling area was achieved by visiting each home of a potential S.

The Ss were tested during two sessions. The *Non-Language Multi-Mental Test* and the *ICS Security Test* were given during a first session and the *Dominion Reading Test* during a second session. The experimental group was tested during regular therapy sessions and the control group during regular school hours. Because testing, particularly of the experimental children, was often difficult the B-forms of the tests were given when any doubt regarding optimal testing conditions existed.

Results

The results of this study indicated not only that the security score means of the experimental Ss were lower than those of the control Ss but also that they were more variable (Table 1). On the expected contaminating variable,

TABLE 1
MEANS AND STANDARD DEVIATIONS OF SECURITY, CONSISTENCY AND
READING SCORES WITH ADJUSTED SECURITY AND CONSISTENCY
SCORE MEANS

Score	Younger		Older		Total	
	E	C	E	C	E	C
N	10	10	15	15	25	25
Security						
Mean	58.45	73.91	68.16	76.24	64.27	75.34
s.d.	13.46	7.50	10.42	8.18	12.66	7.74
Adjusted	59.71	72.66	69.38	75.02	65.51	74.07
Consistency						
Mean	17.41	31.38	23.03	39.18	20.81	36.06
s.d.	11.92	12.93	18.33	19.07	16.30	17.31
Adjusted	19.23	29.93	25.33	37.47	22.89	34.34
Reading						
Mean	4.86	5.93	5.68	6.73	5.35	6.41
s.d.	1.08	1.45	1.62	1.37	1.48	1.46

reading, though the experimental Ss scored approximately one grade lower than the control Ss ($F = 6.39$, $df = 1/46$, $p < .05$, Table 2), the variability of their reading scores was virtually equal to that of the control Ss. However, a two-way analysis of covariance of the security scores with reading scores as covariant demonstrated a significant difference between the security scores of the experimental and control groups ($F = 8.62$, $df = 1/45$, $p < .01$). No differences between younger and older groups and no Age x Group interaction were indicated (Table 3). With adjustment of the mean security scores for the reading covariant the means of the experimental and control groups tended to converge but not significantly.

The consistency scores, in contrast (Table 1), though lower among the experimental than the control Ss, were equally variable. A two-way analysis of covariance indicated a difference between the experimental and control groups ($F = 5.65$, $df = 1/45$, $p < .05$); however, within class variance was also

TABLE 2
ANALYSIS OF VARIANCE OF *DOMINION READING TEST SCORES*
OF EXPERIMENTAL AND CONTROL GROUPS BY AGE

Source	SS	df	MS	<u>F</u> -ratio
Age	7.84	1	7.84	3.60
Group	13.94	1	13.94	6.39*
Age x Group	.01	1	.01	--
Within	100.07	46	2.18	
Total	121.86	49		

* $p < .05$

TABLE 3
ANALYSIS OF COVARIANCE OF SECURITY SCORES OF EXPERIMENTAL AND
CONTROL BY AGE WITH READINGS SCORES AS COVARIANT

Source	SS	df	MS	<u>F</u> -ratio
Age	219.95	1	219.95	2.139
Group	886.00	1	886.00	8.616**
Age x Group	161.02	1	161.02	1.566
Error	4627.27	45	102.83	
<u>F</u> within = .275		<u>b</u> = 2.346		

** $p < .01$

TABLE 4
CORRELATION OF SECURITY AND CONSISTENCY SCORES OF EXPERIMENTAL
AND CONTROL GROUPS AND YOUNGER AND OLDER Ss WITH
READING SCORES PARTIALED OUT IN PARENTHESES

	Younger	Older	Total
Experimental	.93* (.97*)	.78* (.80*)	.76* (.76*)
Control	.84* (.42)	.92* (.92*)	.92* (.90*)
Experimental and Control	.87* (.83*)	.86* (.85*)	.83* (.80*)

* $p < .01$

demonstrated to be significant ($F = 10.18$, $df = 2 \text{ } 25$, $p < .01$). Adjustment of consistency score means for the reading factor showed a convergence of means of the experimental and control groups similar to that shown in the covariant adjustment of security scores (Table 1).

Though the correlations of security and consistency scores were substantial for both experimental and control groups as well as for age and age subgroups, when the reading factor was partialled out differential effects of reading ability upon security and consistency scores became evident (Table 4). The most striking effect was observed in the control group where the correlation between security and consistency scores decreased to nonsignificance among the younger Ss and remained identical among the older Ss.

Discussion

The results of this study indicated that acquired reading skills did not significantly affect the testee's ability to judge and rank statements representing the five levels of security described in the *ICS Security Test*. Hence, the security score was a measure of the child's independence in making his own decisions and of his willingness to accept the consequences of action initiated by such decisions.

Furthermore, the assumption that the children diagnosed by psychologists as emotionally disturbed were also insecure as defined by Blatz (1944) and Grapko (1957) was generally confirmed. However, among the experimental group eight Ss scored within one standard deviation of the mean of the control group. Hence, though not all children diagnosed as emotionally disturbed rated as insecure on the *ICS Security Test*, 68% of those included in this study did obtain low security scores. It would appear, then, that the *ICS Security Test* can function as an effective test to alert the teacher of insecure children some of whom may also be psychologically defined as emotionally disturbed.

The results of this study would, however, suggest caution in regard to the interpretation of the security scores of grades 4 and 5 children. The disappearance of the significant correlation between security and consistency scores of the younger control group when the reading factor was partialled out suggested that reading comprehension among the grades 4 and 5 children in this study may not have been sufficiently developed for them to discriminate among the five alternative solutions. For younger children who obtain low scores on both security and consistency measures it is, therefore, suggested that either a standardized reading test or the elementary form of the *ICS Security Test* (*The Tommy Story*) also be given to provide evidence of whether or not the score obtained by the child reflects not insecurity, but a lack of the type of reading skills required by the *ICS Security Test* (*The Jimmy Story*).

It may be concluded that when reading comprehension skills are relatively mastered, the *ICS Security Test* score does appear to be a valid measure of a factor other than, and almost independent of, the reading factor measured by the *Dominion Reading Test*, namely, security.

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Student and Teacher Attitudes Towards Education: An Exploratory Study

Much interest has been expressed in recent years in the problem of identifying attitudinal changes which take place during the course of teacher preparation. This study was an attempt to explore aspects of this problem, first by developing a particular conceptual model to isolate significant attitudes, secondly by constructing a questionnaire type instrument based on the model, and thirdly by administering the questionnaire to students and teachers at the University of Alberta and analysing the results. This analysis enabled a judgment to be made on the efficacy of the instrument and revealed significant attitudinal differences in students' and teachers' perceptions of education. (Dr. Miller is Associate Professor in the Department of Educational Foundations, Faculty of Education, at the University of Alberta, Edmonton.)

Introduction

Those engaged in teacher preparation are frequently hard put to measure and demonstrate the effects of the educational experiences they provide for their students. To some extent, this is due to the emphasis placed upon the attitudinal and belief-system changes said to occur in students during and as a result of their training; such changes, it is assumed, are intrinsically difficult to measure and account for.

In spite of this, and perhaps because of it, there has been no lack of interest among educational researchers in exploring changes and differences in students' attitudes during the course of their teacher training (McLeish, 1970, pp. 188-200). Most frequently, these studies have investigated attitudes and attitudinal differences in terms of the subjects' preferences for educational situations and procedures, which seem to "hang together" logically (or psychologically) as "clusters" or "factors". Particular individuals can then be categorized as showing strong or weak belief tendencies towards preferences for clusters (we may legitimately call them positions) such as liberalism, authoritarianism, radicalism, and the like.

In the formulation and development of a conceptual-analytic model for investigating attitudes and opinions, the work of Eysenck deserves special men-

tion (Eysenck, 1944, 1947). In his studies of generally held attitudes towards socio-political questions, he employed a two-dimensional classification, political radicalism-conservatism, and tough-tendermindedness. Oliver (1953) independently arrived at a somewhat similar classificatory scheme for examining attitudes toward education. In his attempt to investigate contemporary attitudes in terms of causally significant historical theories of education, Oliver utilised the dimensions of "naturalism-idealism", and "authoritarianism-liberalism", the former representing a metaphysical polarisation of beliefs, the latter discriminating between more strictly pedagogical preferences. The crossing of these two dimensions made possible the representation of four archetypical clusters of preferences or educational philosophies, authoritarian idealism (Plato), authoritarian naturalism (Marx), liberal idealism (Froebel) and liberal naturalism (Rousseau). This "model" was utilized and developed further by Oliver and Butcher (1962, 1968) in their investigations of educational attitudes of teachers according to sex, age, political party, religious affiliation and type of school. One of the more ambitious studies of the many that have followed the work of Oliver and Butcher is that of McLeish (1970). Utilising a multidimensional approach to the analysis of educational opinions, McLeish investigated the changes in attitudes of some 1600 students in colleges of education over a three year program. While the findings of the study were many and complex, they tended to confirm the hypothesis suggested by previous studies that while changes in pedagogical preferences were relatively easy to effect, the more deeply held personal values or "life-philosophies" remained fairly intractable.

The investigation reported here was one of this general type: it was an attempt to shed further light upon the general issue of student and teacher attitudes and beliefs, first by developing an instrument constructed upon an independently conceived two-dimensional model of educational opinions, and secondly by analysing the results of the administration of the questionnaire to 510 students and teachers attending the University of Alberta during 1972-73.

The Theoretical Model and Design of the Questionnaire

At the end of the nineteenth century, John Dewey commented upon the emergence of two fundamentally opposed educational "sects", the one, which he labelled "new", stressing the inviolability of the child's claims to freedom, spontaneity and growth; the other, the "traditional", insisting upon the primacy of control, discipline, order and skill and knowledge acquisition (Dewey, 1902, pp. 3-10). Such schools of thought are well characterised by the terms "childcentred" and "non-childcentred".

The contention that this dualism is still a central element in teachers' and students' belief systems is supported not only by introspection and personal experience but by the results of the studies of several other investigators (McLeish, 1970, pp. 167 ff.). It was decided therefore to utilise the childcentredness-non-childcentredness dualism as a dimension of contemporary educational belief systems, and an attempt was made to isolate the most significant elements of each "cluster". Thus, "childcentredness" seemed to be based upon a belief in the innate goodness of the child, which in turn implied a preference for freedom of development, choice and action, and thus for "instinctive" behaviour such as play, for unstructured learning environments,

and for behaviour arising out of motivational needs. To such a set of preferences could be opposed "non-childcentredness", which seemed to rest upon a denial of innate goodness, and to imply corresponding preferences for discipline, for habitual or learned behaviour, such as work, for structured learning environments, and for the primacy of prescriptive needs.

On the basis of such an analysis, it was decided to formulate ten statements giving positive responses to each of the elements of childcentredness and ten to those of non-childcentredness. The strength of an individual's preference for childcentredness or inferred distaste for non-childcentredness was measured by a score obtained by assigning numbers to responses given to the statements (1 indicating strong agreement with a non-childcentred position, 2 indicating agreement with a non-childcentred position, 3 indicating no preference, 4 indicating a preference for a childcentred position, and 5 indicating a strong preference for a childcentred position) and then totalling them. The possible range of scores was thus 20 to 100, the former representing the most extreme position of non-childcentredness and the latter the most extreme of childcentredness.

In understanding and explaining contemporary educational belief systems, this dimension is perhaps an important one; but it is not the only one. Even a cursory investigation of the literature of pedagogy in the nineteenth century reveals that Dewey's summary of the development of educational thought is too simplistic. Educational opinion did and still does split on the dualism of childcentredness versus non-childcentredness. But it split, and still does split, just as deeply on other issues, and on none more profoundly and significantly than the nature and status of modern science and scientific inquiry. Indeed, this question, raising as it does metaphysical, epistemological, axiological and theological considerations, is more fundamental and potentially more generative of lasting differences in educational thought and practice. It was decided, therefore, to add this dimension to the original one of childcentredness-non-childcentredness.

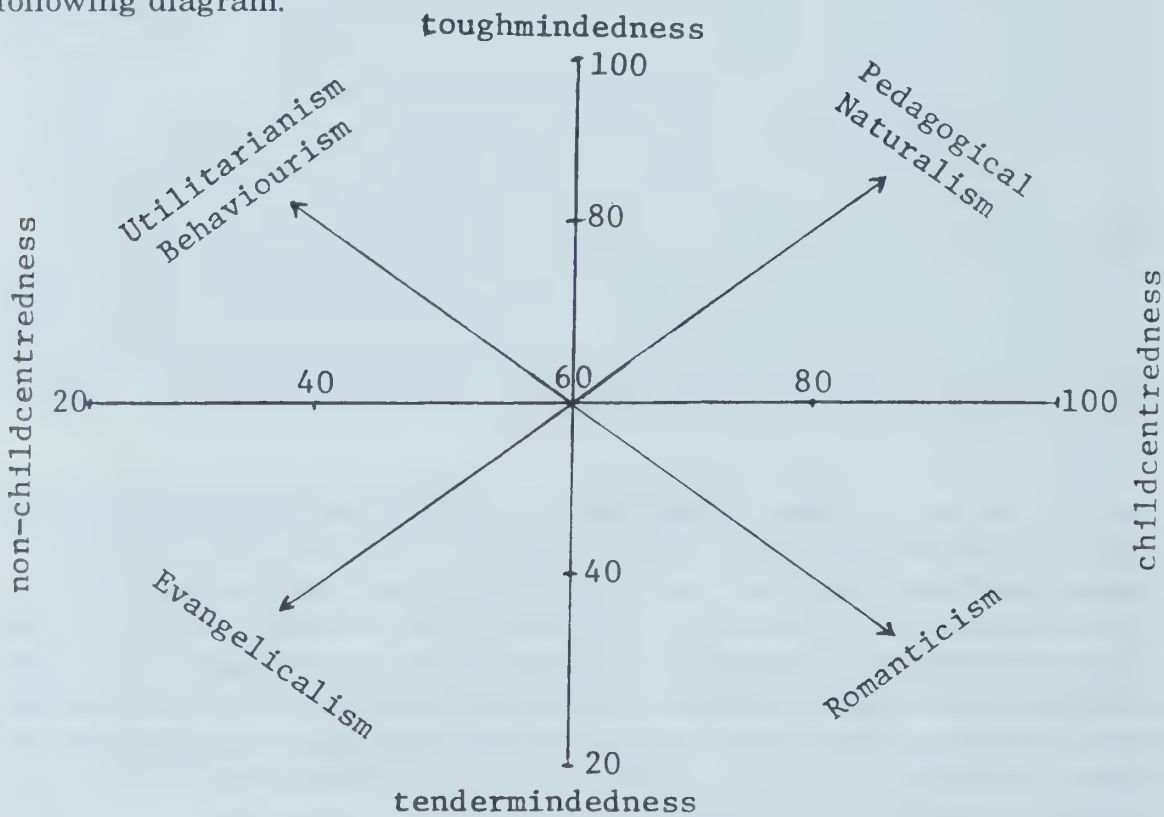
The second dimension was conceived of in terms of two opposing clusters of logically related preferences, designated respectively as "toughmindedness" and "tendermindedness". The discrete yet related elements of toughmindedness were identified as a belief in or preference for metaphysical materialism and consequently for empiricism, determinism, and objectivity as a characteristic of inquiry, knowledge and professional relationships. To these could be opposed the cluster of preferences designated tendermindedness, the principal elements of which were preferences for metaphysical transcendentalism, intuitionism, free will, and subjectivity as a characteristic of inquiry, knowledge and human relationships.

As in the treatment of the previous dimension, ten statements representing agreement with the discrete elements of each cluster were formulated. The relative strength of an individual's preference for toughmindedness or tendermindedness was measured in a similar fashion to that of the previous dimension, the possible range of scores being 20 to 100, the former representing extreme tendermindedness, the latter extreme toughmindedness.

The instrument thus consisted of forty statements, the four clusters of preferences, "childcentredness", "non-childcentredness", "toughmindedness" and "tendermindedness", each being represented by ten statements.

Ideationally, the instrument made possible the association of childcentredness or non-childcentredness with either toughmindedness or tendermindedness. These associations produce four archetypical educational positions, or clusters of preferences, each corresponding to an historically significant and contemporaneously recognizable educational theory. Thus the association of childcentredness with toughmindedness may be seen as characteristic of pedagogical naturalism as conceived and explained by Rousseau and Dewey, and with tendermindedness as typical of educational romanticism, as felt and expressed by the literary imagination of a William Blake or Charles Dickens, by the fertile minds of modern client-centred therapists like Rogers and Laing, and in the experiments of Homer Lane and A. S. Neill. The association of non-childcentredness with toughmindedness may be seen as representative of the educational ideas of 19th century utilitarians such as J. Bentham and James Mill and 20th century behaviourists like J. B. Watson and B. F. Skinner; and with tendermindedness of the educational implications of the Christian view of the child, particularly as viewed by the nineteenth and twentieth century Evangelical.

The nature of the positions under investigation are represented in the following diagram:



Procedure

The instrument was administered to 510 students and practicing teachers attending classes in the Faculty of Education at the University of Alberta during 1972 and 1973. No criteria, other than availability, were used in the selection of the respondents. They were, however, required to supply biographical information concerning age, sex, years of teaching experience, years of university level education, teaching specialisation, and whether they were in the

Elementary or Secondary route of teacher preparation. They were then asked to respond to the forty statements twice, first indicating their own degree of agreement or disagreement with each statement, and secondly giving the response which they believed "the system" or "those who control education" (i.e. politicians, administrators, teachers) would give to each statement. It was expected that a measure would thus be obtained not only of the respondents' own belief patterns, but also of their conception of the educational values and attitudes of the system within which they were either working or destined to work.

Analysis of Data

The analysis of the data was carried out in several stages. Following the transfer of all biographical information and both sets of item responses to computer cards, an attempt was made to investigate the validity of the instrument by subjecting the data to an item and factor analysis.

The item analysis of students' and teachers' responses concerning their own beliefs about education provided the following significant information. The means of almost all of the 40 responses (on a five point scale) were clustered around the score three, with a low of 2.12 and a high of 4.08, with standard deviations for all items within the range of .96 to 1.27. There were thus no items which were judged to be sufficiently eccentric to warrant special treatment or exclusion from further analysis.

The analysis of the responses concerning attitudes and beliefs attributed to the system yielded slightly different information. Since, as will be noted later, there existed considerable agreement about how the system actually operated (i.e. relatively toughmindedly and non-childcentredly) the means of the twenty items concerned with the tough-tenderminded dimension were clustered around 4, while those dealing with the childcentred-nonchildcentred dimension were consistently close to 2. This considerable degree of unanimity was apparent in the much lower standard deviation for each item, only 16 of 40 being above 1 and the range from .75 to 1.20.

In view of the complex nature of the theoretical framework of the instrument it is not surprising that factor analysis revealed the presence, in the responses, of several significant factors. Indeed there were in the personal belief responses no less than fourteen "significant" factors (i.e. with eigenvalues greater than 1). Of these the first two were especially significant accounting for 4.65 and 2.61 of a total variance of 22.41.

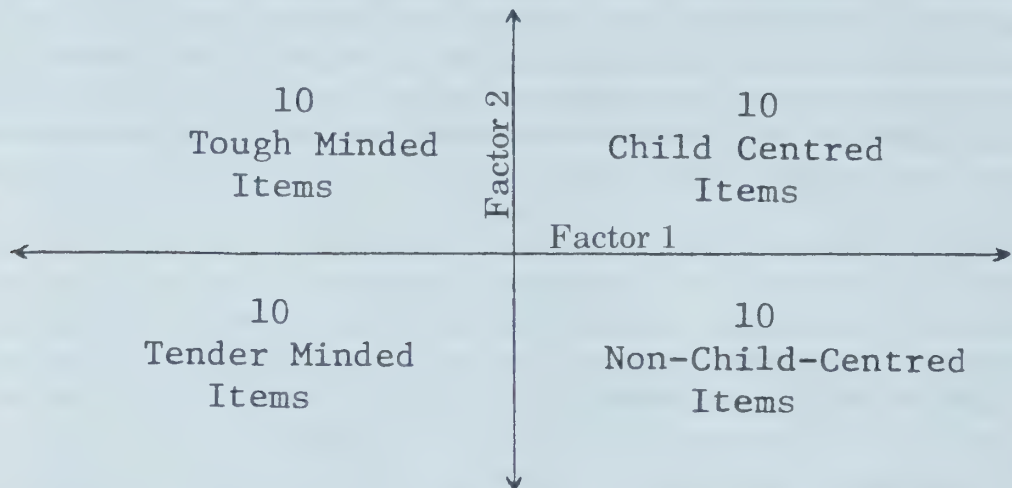
The first factor clearly represented the general factor of child-nonchildcentredness as opposed to tough-tendermindedness and separated clearly all items associated with sub-test 1 concerning child-nonchildcentredness from those of sub-test 2 concerning tough-tendermindedness.

The second factor was more complex. Upon analysis it was revealed to be a combination of toughmindedness with childcentredness (naturalism) as opposed to tendermindedness with nonchildcentredness (evangelicalism).

Printed out on an unrotated factor matrix, factors 1 and 2 gave the following distribution of items.

The resultant separation of the forty items into four groups of ten, each group comprised solely of items associated with one of the four polarities used

in the construction of the questionnaire, was taken as evidence that the items in each group were, in fact, related to each other and comprised a distinct and measurable preference cluster.



The factors involved in the responses concerning the beliefs attributed to the system were essentially similar. There were 13 “significant” factors and the first two factors, which accounted for 6.30 and 2.36 of a total variance of 22.49 represented the same theoretical aspects of the instrument.

As a result of this analysis, it was judged that the further examination of responses in terms of the original theoretical framework was worthwhile, and several analyses of variance were carried out comparing personal beliefs with beliefs about the system according to sex, student-teacher status, age, years of teaching experience and years of university training, and whether Elementary or Secondary route.

Summary of Findings

By far the most significant difference revealed by analysis was that between the respondents’ own beliefs and those they attributed to the system, which was almost universally perceived to be less childcentred and more toughminded than the respondents themselves. In fact, of the 510 respondents, only 45 saw the system as being more childcentred than themselves and 62 as more tenderminded than themselves.

In tabular form, the total group mean scores were as follows:

	Child Centred and Non-Childcentred Dimension	Tough-Tender Minded Dimension
Personal Beliefs	61.5	60.0
Beliefs attributed to system	42.5	71.0
	p < .001	p < .001

The possible explanations for this dichotomy are many and highly speculative. They would appear, however, to be connected with the tendency of educationists and the teaching profession to conceive of childcentredness and tendermindedness (characteristic “romantic” responses) as more relevant, more human and thus more desirable than nonchildcentredness and

toughmindedness (characteristic “utilitarian” responses) which are judged to be mechanical, cold and inhuman.

In this connection, it is interesting to note the preference expressed by the Worth Commission for the “Person-Centred Society”, with its “self discovery and self expression, service to others, individualism, sensualism, . . . capacity for joy and self-fulfillment” as opposed to the “Second-Phase Industrial Society” with its “self control and self discipline, self advancement, conformity, puritanism, . . . endurance of stress and acquirement” (Commission on Education Planning, 1972, p. 32).

Thus, somewhat ironically, the same individuals who were working or who had chosen to work in “the system”—and who therefore in a very real sense comprised it—saw themselves as committed to radically different educational values from those generally associated with the institution and operation of universal public schooling. Whether this dichotomy is peculiar to those who choose teaching as a career or whether it is a result of teacher education programs are clearly questions which deserve further study.

The analyses of variance carried out within the total group revealed one major significant difference, that between the degree of childcentredness of those who were actually engaged in teaching and those who were attending university. In tabular form, the mean scores of these two groups on the childcentred-nonchildcentred dimension were as follows:

	Teachers	Students	
Personal Beliefs	55.4	62.6	$p < .001$
Beliefs attributed to system	45.1	42.0	$p < .001$

Students, then, according to their responses, were more childcentred and saw the system to be less childcentred than did teachers. While both students and teachers perceived a gap between their own belief system and that of the system, this gap was significantly larger for the student. However, in terms of the tough-tenderminded dimension, there were no significant differences between students and teachers: both perceived it to be equally more toughminded than themselves.

Further analyses of variance conducted upon other groups served to confirm but not in any important sense to enlarge upon this finding. The analysis according to years of teaching experience revealed a significant difference ($p < .01$) in childcentredness only between those who had never taught (more childcentred) and those who had (less childcentred), and no differences at all in terms of tough-tendermindedness. The actual length of teaching experience did not appear to be a significant factor in affecting the degree of child or non-childcentredness.

The analysis of age group differences provided further confirmation of these findings. The only significant difference ($p < .02$) in degree of childcentredness was between those who were under 21 (largely made up of those who had never taught) and those over 26 (largely made up of those who had taught). Once again, the former were more childcentred, and once again, there were no significant differences in the tough-tenderminded dimension.

Further analyses conducted according to sex, elementary or secondary route, and years of university training revealed no further significant differences in either dimension.

In conclusion, as far as the dimension of childcentredness was concerned, the one factor which appeared to be crucially significant was whether or not the individual had actually faced a class of students as a fulltime teacher. Just as marriage is said to be the cure for love, so perhaps is professional contact with children the cure for childcentredness. In this dimension, age, sex, length of teaching experience and university training did not appear to be significant factors.

Perhaps the most interesting finding was the failure of the analyses to reveal any significant correlates of tough or tendermindedness. To some extent, this adds support to other studies which have shown that, while teacher training can, perhaps, modify or even create pedagogical and procedural preferences, in terms of fundamental metaphysical, epistemological and axiological beliefs whose significance for the individual transcends the classroom situation, it seems to exercise little influence (McLeish, 1970, pp. 168-178). Faculties of Education may well turn out teachers with "correct" pedagogical preferences, shortlived as they may be; they have not, to date, succeeded in turning out "better" people. Nor, of course, is it clear that they should attempt to do so.

In the analysis and interpretation of the data discussed in this paper, the assistance of Ms. Wendy Kersteen is gratefully acknowledged.

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Bilingual Education and Cognition

Sixty-one grade 6 balanced bilinguals drawn from the French-English bilingual program of the Edmonton Separate School System were found to perform at a significantly higher level than sixty-one unilinguals, matched for sex, SES, and age, on several measures of reasoning and divergent thinking.

The performance of children in the bilingual program from French speaking homes, English homes and homes where both French and English were spoken was also examined. The French group, despite being most balanced in French and English linguistic skills, performed at a significantly lower level than the other two bilingual groups (but not the unilinguals) on a measure of verbal reasoning. (Dr. Gulutsan is Professor in the Department of Educational Psychology; Mr. Cummins is a graduate of the University of Alberta, and now with the Educational Research Centre at St. Patrick's College, Dublin, Ireland.)

Introduction

Bilingual education has been defined as "schooling provided fully or partly in a second language with the object in view of making students proficient in the second language while, at the same time, maintaining and developing their proficiency in the first language and fully guaranteeing their educational development" (Stern, 1972, p. 1). Stern (1973) points out that in recent years there has been an eagerness to make education in two languages much more widely available and to regard bilingual schooling as educationally desirable and as a remedy for a number of social ills.

This renewed interest and optimism is in contrast to the earlier belief that bilingual schooling has negative consequences for the child's intellectual and emotional development. Tucker and d'Anglejan (1971) outline four widely held beliefs regarding bilingual education. These are:

1. Children who are instructed bilingually from an early age will suffer cognitive or intellectual retardation in comparison with their monolingually instructed counterparts.
2. They will not achieve the same level of content mastery as their monolingually instructed counterparts.

3. They will not achieve acceptable native language or target language skills.
4. The majority will become anomic individuals without affiliation to either ethnolinguistic contact group.

These beliefs were based on the results of many psychometric studies since the early 1920's in which bilinguals performed at a lower level than unilinguals on various intelligence and personality tests (Jensen, 1962a; 1962b). However, Peal and Lambert (1962) point out that many of these early studies were poorly designed in that they failed to control for confounding variables such as socioeconomic class and the bilingual's knowledge of his two languages. The prevailing beliefs regarding the negative effects of bilingualism on intellectual and emotional development were dramatically reversed when Peal and Lambert (1962) reported that their group of ten-year-old balanced bilinguals performed at a significantly higher level than their unilingual group on both verbal and non-verbal measures of intelligence. In addition, the bilinguals had more positive attitudes towards the other ethnic group than did the unilinguals. Subsequent studies of the cognitive consequences of bilingualism (Liedtke and Nelson, 1968; Balkan, 1970; Ianco-Worrall, 1972) and evaluations of bilingual education programs (Lambert & Tucker, 1972; Casserly & Edwards, 1973) have confirmed many of Peal and Lambert's findings and have tended to support the view that access to and use of two languages in early childhood might accelerate some aspects of cognitive development.

The St. Lambert bilingual education program in Montreal provides the best documented evidence for this position. This program, which has become world famous, is characterized by a home-school language switch. In kindergarten and first grade all instruction is through the medium of French (even though English is the language of the home). In the second grade formal instruction in English language arts is introduced and in subsequent grades English is gradually introduced as a medium of instruction for some subjects.

The consequences of this program for the children's academic, emotional and intellectual development have been evaluated after each grade level (Lambert & Tucker 1972). Lambert and Tucker (1973) in summarizing the results after the seventh grade level report that the experimental group, at no cost to their level of achievement in English, mathematics or science, become fluent bilinguals and show more positive attitudes to French people than do the controls. In addition,

... by grade five the children generally perform better on a comprehensive English-based measure of verbal intelligence than do the controls. In terms of creativity, the experimental children perform as well as, or better than, the controls (1973, p. 91).

Lambert and Tucker (1972) suggest that there is a positive transfer of skills across languages, and the bilingual child's vocabulary and understanding of complex linguistic functions is increased by comparing and contrasting his two languages. This suggestion is supported by recent results from the bilingual program of the Ottawa Separate School Board. Casserly and Edwards (1973) report that children in the bilingual program perform significantly better than children in the normal school program on several measures of psycholinguistic abilities. Differences between the groups at the grade three level are even greater than at the grade one level. In summary, evaluations of bilingual education programs suggest that bilingual education might have positive effects on cognitive functioning.

Bilingual Education in Edmonton

Tucker and d'Anglejan (1971) point out that although diverse innovative approaches to bilingual education have been tried in many places, very few have been systematically evaluated. Bilingual education in Edmonton is no exception. Although several investigations related to bilingualism and cognition have been conducted in Edmonton (e.g. Olson, 1962; Liedtke & Nelson, 1968) no attempt has been made to systematically evaluate the effects of bilingual education in Edmonton on the child's cognitive functioning.

Such an evaluation is important since, as Mackey (1971) points out, there are an extremely large number of bilingual learning situations, and consequently many different ways of becoming bilingual. Therefore, research results obtained in any one bilingual learning situation are not necessarily generalizable to any other. The learning of two languages will affect cognition in different ways depending on the age at which the languages are learned, whether they are learned separately or simultaneously, the opportunities for using both languages in the home, school and wider environment, the prestige of the two languages, etc. Therefore, each bilingual education project must be planned according to the needs of the particular area in which it is located and must be evaluated independently of any other bilingual education project.

There are important differences in the bilingual learning situations of children in the bilingual program of the Edmonton Separate School Board and children in the St. Lambert project in Montreal. The St. Lambert project involves a relatively homogenous group of middle-class anglo-saxon children. Therefore, the bilingual curriculum could be designed to meet the specific needs of this particular group. The Edmonton program, however, must try to meet the needs of children who come from several different types of linguistic backgrounds. The majority of the children in the Edmonton program come from French-speaking home backgrounds. In some of these homes French is the only language used and children are likely to have encountered English only when they went out to play. However, in other homes both French and English are spoken by the parents and the children are likely to grow up with a knowledge of both languages. Some of the children come from an English-speaking home background and are likely to be similar in motivation and background to the children in the St. Lambert project. However, the opportunities for using French outside of school hours are much greater in Montreal than in Edmonton. In the Edmonton program there are also a few children whose home language is a language other than French or English. It can be seen that children who enter the grade one classes of the bilingual program in Edmonton differ markedly in their abilities to understand and speak both French and English.

Objectives of the Study

The first objective of the present study was to reexamine, in the Edmonton setting, Peal and Lambert's (1962) findings that balanced bilinguals performed at a higher level than unilinguals both on verbal and non-verbal measures of intelligence. In addition, the effects of bilingualism on divergent thinking was examined. Although Lambert and Tucker (1972) report no consistent differences between the experimental group and the controls on measures of divergent thinking, Landry (1974) found significant differences on measures

of divergent thinking between children who had learned a second language in elementary school and those who had not.

The second objective was to examine the effects of bilingual education on children from English, French and mixed French-English home background. These children come from different linguistic and cultural backgrounds, have different motivation for coming to a bilingual school and different degrees of bilinguality upon entering. To what extent does the bilingual learning experience provided in the Edmonton bilingual program promote the cognitive development of each type of child? How successful is it in producing children who are fluent in both French and English? In order to answer these questions the performance of these three types of children was examined both on measures of linguistic balance and on a battery of reasoning and divergent thinking tests.

Method

Sample

The bilingual sample was drawn from the French-English bilingual program of the Edmonton Separate School System. Three grade six classes (85 students) from three different schools were tested. These students were administered a questionnaire which asked which language they spoke at home and with their friends, and which language their parents spoke at home. On the basis of the language or languages spoken at home by their parents, the children were divided into homes where both parents spoke English, homes where both parents spoke French and homes where the parents spoke both French and English. Three students were eliminated because of knowledge of a third language (other than French and English) and from the remainder a group of sixty-one students was selected on the basis of three measures of linguistic balance. The composition of the balanced bilingual group in terms of home background was as follows: French, 25 (out of a possible 29); Mixed French-English, 24 (out of 30); English, 12 (out of 23).

The unilingual group was drawn from two schools in the Edmonton Public School System. Eighty-nine students from three classes were tested. A questionnaire was administered to determine whether the children had any knowledge of a language other than English, and on this basis eighteen students were excluded from the sample. From the remainder a group of sixty-one students was matched with the bilingual group on the basis of sex, socioeconomic status (SES) and age.

Both bilingual (B) and unilingual (U) groups consisted of 32 girls and 29 boys; their SES indices (Blishen 7-point scale) were 3.59 (B) and 3.60 (U) and their mean ages were 11 years 6 months (B) and 11 years 7 months (U).

Materials and Procedure

Balance Measures: (a) Word Association Test: This test was similar to the word association test used by Peal and Lambert (1962). The children were asked to write down as many words as they could think of, in the language of the stimulus word, which seemed to "go with" or "belong with" that word. Four words were given in each language and an interval of 60 seconds was allowed for association to each word. The balance score was calculated as follows:

$$\frac{(\text{Sum of English words}) - (\text{Sum of French words}) \times 100}{(\text{Sum of English words}) + (\text{Sum of French words})}$$

A zero score indicates perfect balance between the two languages. Peal and Lambert's (1962) criterion of balance was ± 30 . The criterion in the present study was slightly more stringent— ± 25 .

(b) Subjective Self-Rating: The bilingual subjects were asked to rate their ability to speak, read, write and understand English and French on 4 point scales ranging from "not at all" to "very well". Four points were given for a "very well" response and one point for a "not at all" response, so that the maximum score for each language was 16. The ratio of the English and French self-ratings was used to form a balance score.

(c) Teacher Rating: The third measure of balance was the teachers' ratings of the child's relative competence in English and French. The teacher was asked whether the child benefited "much more", "somewhat more", or "equally" from instruction in either language.

The ratio of the English and French self-rating scores and the teachers' ratings were transferred to the same scale as the word association test and a composite balance score was formed by combining the three measures. The criterion for inclusion in the balanced group was ± 25 .

The balance measures were used in the present study to assess the relative fluency in English and French of the children in the bilingual program and to eliminate those who were much more dominant in one of their two languages. Thus the notion of "linguistic balance" does not imply equilinguality.

Reasoning Tests: Three subtests (1, 2 and 4) of the *Kuhlmann-Finch Intelligence Test* designed to measure verbal and spatial abilities and general reasoning were administered. In addition the Lorge-Thorndike I.Q. from the school records was included in the analysis.

Divergent Thinking Tests: The *Utility Test* from the French, Ekstrom and Price (1963) *Kit of Reference Tests for Cognitive Factors* was administered as a measure of verbal divergence. The *Utility Test* asks subjects to list as many uses as they can think of for two common objects—"pencil" and "brick". Six minutes were given for response to each word and the children were instructed to try and think of uses that nobody else would think of.

Wallach and Kogan's (1965) *Patterns Test* (adapted for group administration) was administered as a measure of non-verbal divergence. This test consists of a series of eight "meaningless" line drawings and the child was required to list as many things as he could think of that each drawing might represent.

The *Utility Test* was scored for fluency (number of uses listed), flexibility (extent to which the class of uses is shifted) and originality (uniqueness of response). The figural *Patterns Test* was scored for fluency and originality. The originality score was calculated in the following manner for both *Patterns* and *Utility* tests. Any response which occurred between 2 and 6 times inclusive (out of the total sample of 174 subjects) was credited with 2 points and any unique response (occurring only once in the entire sample) was credited with 5 points. This technique is similar to that of Taylor (1971) and represents a compromise between the rather complex weighting system suggested by Cropley (1967) and the lack of any weighting in the Wallach-Kogan (1965) scoring procedure.

Results and Discussion

The performance of the balanced bilingual and unilingual groups, matched for sex, SES and age, was analysed by means of a one-way analysis of variance. The means, standard deviations, F values and probability levels are shown in Table 1.

TABLE 1
ANALYSIS OF VARIANCE FOR BILINGUAL AND UNILINGUAL GROUPS

Variable	Bilingual (N=61)		Unilingual (N=61)		F Value ¹
	M	S.D.	M	S.D.	
Kuhlmann-Finch (KF) 1 (Verbal ability)	15.90	3.8	14.11	5.0	4.97*
KF 2 (Spatial ability)	10.36	4.4	11.34	4.4	-1.54
KF 3 (General reasoning)	15.62	3.7	14.08	4.9	3.90*
Lorge-Thorndike I.Q. percentile	65.93	23.0	64.98	26.9	.04
Utility fluency	19.95	6.1	20.75	6.8	- .47
Utility flexibility	13.67	6.1	12.57	5.7	1.05
Utility originality	11.44	8.7	7.13	5.2	10.98***
Patterns fluency	23.80	11.5	25.02	10.8	- .36
Patterns originality	21.39	12.6	18.98	13.0	1.08

* $p < .05$

*** $p < .001$

¹ Positive entries indicate that the mean for the bilingual group is higher than the mean for the unilingual group. Negative entries indicate reverse.

The bilingual group performed significantly better than the unilingual group on the verbal ability and general reasoning subtests and also on the measure of originality in the verbal test of divergence.

These results are in agreement with the findings of the Peal and Lambert (1962) study and with trends which have emerged from more recent studies (Liedtke & Nelson, 1968; Balkan, 1970; Lambert & Tucker, 1973; Casserly & Edwards, 1973; Landry, 1974). The results of the present study support the position that, under certain conditions, becoming bilingual can accelerate some aspects of cognitive development. This fact, however, does not exclude the possibility that in different bilingual learning situations, bilingualism or bilingual schooling might have negative effects on cognition. In considering the effects of bilingualism on cognitive growth, the circumstances under which the languages were acquired must be examined. This point is expressed by Ianco-Worrall (1972, p. 1391) when she says that a "different, albeit overlapping, constellation of variables would have to be defined for each type of dual-language acquisition, and this in turn related to aspects of cognitive development."

In recognition of this fact, the performance of children who had acquired their two languages in three different bilingual learning situations was examined in the present study. Since there were significant differences between the three home background groups on SES ($p < .03$) the data were analysed by means of a one-way analysis of covariance with SES as covariate. This analysis is shown in Table 2.

TABLE 2
ANALYSIS OF COVARIANCE FOR CHILDREN FROM ENGLISH,
FRENCH, AND MIXED HOME BACKGROUND WITH SES AS COVARIANCE

Variable	English Adj. $\bar{X}$	French Adj. $\bar{X}$	Mixed Adj. $\bar{X}$	F Value
English Word Association	29.32	29.88	30.37	.08
French Word Association	17.40	25.37	21.61	5.70 **
English Self-rating	15.42	14.64	15.39	2.35
French Self-rating	11.67	14.31	12.72	14.85 ***
Word Association Balance Ratio	25.20	13.03	17.29	6.00 **
Self-rating Balance Ratio	24.36	12.33	17.30	4.85 **
Teacher Ratio	29.65	10.93	14.78	7.08 ***
Balance Composite	26.21	11.95	15.82	10.27 ***
KF 1 (Verbal ability)	16.74	14.36	16.32	3.10 *
KF 2 (Spatial ability)	10.26	10.06	11.48	.87
KF 4 (General reasoning)	14.26	14.43	16.32	1.95
Lorge-Thorndike I.Q. percentile	70.02	60.81	65.20	1.03
Utility fluency	19.34	18.15	20.10	.78
Utility flexibility	12.63	13.10	12.10	.20
Utility originality	9.11	10.77	10.77	.34
Patterns fluency	23.71	23.68	23.25	.01
Patterns originality	24.07	20.38	20.35	.58

* $p < .05$
 ** $p < .01$
 *** $p < .001$

There are highly significant differences between the groups in the level of balance achieved between French and English. The French group is most balanced, the Mixed group next and the English group least balanced. The only significant difference on the cognitive measures is on the verbal ability test. The mean of the French group is significantly lower than that of the other two bilingual groups.

The lower score of the French group on the verbal ability measure suggests that their surface fluency in English (their balance scores show slight *English* dominance) might not have fully penetrated to the conceptual level. Since the French group perform as well as the English group on the spatial ability and general reasoning measures they are obviously not suffering from a general intellectual handicap. However, the data indicate clearly that they do experience difficulty (in comparison to the other bilingual groups) in functioning at the conceptual level through the medium of English. It should be emphasized, however, that the scores of the French group on the verbal ability measure are as high as the scores of the unilingual group. Thus, we are talking not so much in terms of a handicap in verbal reasoning as a lack of enrichment.

Would the French group perform better on a verbal intelligence measure administered in French? This cannot be answered for certain, but there are indications in the present data that they would not. Their verbal fluency in French (as measured by the word association test) is lower than it is in English and they have no more confidence in their French linguistic skills than in their English linguistic skills. Both their French and English self-rating scores are lower than the English self-rating scores of the English and Mixed groups. Thus, although the French group has developed more skills in English than either of the other two groups have in French (i.e. the French home background children have become more balanced bilinguals), they appear to pay for their increased competence in English by a lowering of their competence in French.

This result appears to lend some support to Macnamara's (1966) "balance effect" hypothesis, i.e. that as a bilingual develops skills in one of his two languages, he pays for it by a decrease in competence in the other. The French children's difficulty in expressing their intelligence through the medium of English can probably be attributed to lack of practice in using English in a cognitively demanding situation. Interaction with adults is an important element in promoting cognitive growth both before and after school entry. Before school entry the French child's interaction with adults would have been largely through the medium of French. He is likely to have gained competence in English at around school age through interaction with English-speaking peers. This interaction is likely to have been at a fairly low level of conceptual complexity and can account for the French child's fluent "surface" competence in English (as measured by the balance tests). However, this "surface" competence does not appear adequate to permit the French child to function as well as members of the other bilingual groups when complex linguistic reasoning is involved. Initially, the conceptual features of the French child's environment would have been coded in French. In school a partial transfer is required and the French child must express his intelligence (in some subject areas) through the medium of English. The present data suggest not only that the French child has had difficulty in effecting this transfer efficiently but also that the necessity to perform this transfer may have led to a lowering of his competence in French itself.

In summary, what is being suggested is that the French children gain their "surface" competence in English from interaction with peers in a cognitively undemanding situation, but their English interaction with adults in a cognitively demanding situation at school is insufficient to allow them to ade-

quately express their intelligence through this medium. More research is needed to test the validity of these speculations.

On the intelligence measures the cognitive advantage of the Mixed group in relation to the unilinguals is most marked. On the verbal ability measure they perform as well as the English group and better than the French group. This indicates that the Mixed group, who have had bilingual experience in the home, are as proficient in linguistic reasoning involving L_1 (English) as those whose early upbringing has been totally through the medium of L_1 , and at a definite advantage over those whose early experience has been in a minority language (L_2). Although the differences do not reach significance ($p < .15$) the Mixed group score higher than either of the other two groups on the general reasoning test. This adds weight to Balkan's (1970) finding that early bilinguals (both languages learned before the age of four) were more cognitively flexible than children who learned their languages at a later age.

Implications for Bilingual Education

While the implications are, in general, encouraging in that they indicate that bilinguals who are capable of achieving balance between their two languages perform at a higher level than unilinguals on certain kinds of cognitive tasks, there are some reservations. In the first place, by grade six most children who are not capable of benefiting from the bilingual program are likely to have dropped out and thus the possible negative effects of bilingual schooling on some children would not appear in the results of the present study.

Also it is clear that bilingual schooling has different effects on children from different home backgrounds. The balance scores in Table 2 show that six years of bilingual schooling have not led to a high degree of balance among the English home background group. There are highly significant differences between this group and the other two groups on all the balance measures. Thus, one can conclude that in an English speaking community such as Edmonton, school experiences alone are not sufficient to develop in the child from an English home background a level of balance equal to that of the French or Mixed groups. However, when one considers the fact that the only opportunity the child from an English homebackground has to use French is in the classroom (since English is the language of the playground), his level of competence in French seems much more impressive, and his level of balance far beyond what might be achieved in the usual French program.

Another significant factor is that no cognitive deficits are apparent in the English home background child even though much of his schooling has been through a weaker language. In fact six years of bilingual schooling seem to have conferred definite cognitive advantages on this group of children. Their high score on the verbal ability measure adds weight to Lambert and Tucker's (1972) assertion (in relation to a similar group) that the comparison of languages helps children "immeasurably to build vocabulary and to comprehend complex linguistic functions" (1972, p. 208). The results for this group, supported by the data of the St. Lambert project in Montreal, indicate that with relatively intelligent, relatively high SES children, teaching through the medium of the child's weaker language need have no negative cognitive effects and is likely even to be a cognitive enriching experience.

The situation of the Mixed group is similar. Their scores on the English balance measures (English word association and English self-rating) are as

high as those of the English group, and their scores on the French balance measures only slightly lower than those of the French group. Their scores on the spatial ability and general reasoning tests are higher than those of the other two groups. The type of bilingual program in the schools tested, i.e. Dual-medium Maintenance as classified by Mackey (1971), seems especially suitable for these children since they are likely to have been reasonably fluent in both languages before coming to school and both languages are spoken in the home.

The performance of the French group on the balance and verbal ability measures raises some doubts as to whether this particular bilingual program is right for them. The French children in the present study seem to be caught between two languages as far as verbal reasoning is concerned. One must therefore ask whether it would not be better to differentially emphasize one of the French groups' languages in relation to the other. For example, a school conducted mostly through French would likely not affect the child's conversational fluency in English (since this is largely acquired in the world outside) but might render French a more adequate instrument for representing conceptual processes. On the other hand, more time spent through the medium of English in a conceptually demanding school situation might improve the French child's verbal reasoning abilities in English, which, if the child stays in Edmonton, is the language he will be required to use for most of his daily activities.

Conclusion

This study has shown that children who were educated bilingually and who had achieved a moderate degree of balance between their two languages performed at a significantly higher level than unilinguals on various measures of cognitive performance. The most obvious educational implication of this result is that we may be depriving many children not only of the cultural, but also of the cognitive enrichment of becoming bilingual by not instituting more widespread bilingual education in the early grades of elementary school. However, the differences between the three home background groups in the present study emphasize the fact that in every bilingual learning situation there are different causal factors operative and curricula for bilingual education programs must be planned with the specific needs of different types of students in mind.

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Bicultural Excursion Programs: Their Effects on Students' Stereotypes, Attitudes and Motivation

This report summarizes the results of an evaluation of a bicultural excursion program undertaken by grade 8 students. The purpose of the evaluation was to determine the extent to which students' stereotypes, and attitudes were influenced by a brief four-day excursion to another linguistic/cultural community. Students were tested before and after the excursion. The results indicated that the students benefited by a greater appreciation of the other linguistic/cultural community, more favorable attitudes towards that group, and an increased interest in learning the language for integrative reasons. The pedagogical implications of bicultural excursion programs are discussed.

A number of investigations (Feenstra & Gardner, 1968; Gardner & Lambert, 1959, 1972; Gardner & Santos, 1970; Scherer & Wertheimer, 1962; Smythe, Stennett & Feenstra, 1972) have examined the role of motivational variables in second-language acquisition. These investigations have demonstrated that achievement in a second language is associated with a high level of motivation, and evidence has accumulated indicating that an important aspect of this motivation is the "willingness to be like valued members of the (second) language community" (Gardner & Lambert, 1959, p. 271). This motivational complex has been referred to as an integrative motive (Gardner, 1966). At an empirical level, the integrative motive is characterized by high scores on a number of measures; the predominant characteristics include an integrative orientation, a high motivational intensity to learn the second language, a strong desire to learn the language, favorable attitudes toward the other language community, and increased feelings of anomie.

The major purpose of this investigation was to determine whether changes in various aspects of the integrative motive would occur as a result of a brief excursion by students into the other-language community. Students were administered a battery of attitude tests both before and after a brief excursion to Quebec City, thus, the present study can be viewed as an evaluation of the merits of excursion programs when the criterion of success entails changes in

the integrative motivation of the students involved. The excursion in the present study was quite modest in scope and intensity when compared with more ambitious programs which involve student exchanges and more prolonged periods of bilingual immersion. The Quebec excursion was designed only to provide a short period of exposure to a culture where the second-language (i.e., French) is widely used. Thus, one may contrast the two types of experience both in terms of their duration and intensity and in terms of an active-passive dimension. That is, students engaged in an exchange programme during which they are billeted with a family who speaks the second-language presumably would have both a greater need for, and a greater opportunity to practice their second-language skills, whereas the students in the present study could assume the role of passive observers and conceivably need speak nothing but their mother tongue. The general aims of the French program of the London Public School System (see Bramwell, Smythe, & Dumas, 1973) refer specifically to attitude development, linguistic development and cultural development, and the excursion program was designed as one way of achieving these aims. Thus, although the present study is concerned largely with evaluating the excursion program with respect to the objectives of the French language program as developed by the London Board of Education, it is reasonable to assume that these objectives approximate the guidelines adopted by many other school boards. Furthermore, it will be noted that these aims refer to some of the aspects of the integrative motive.

Method

Subjects

The subjects (Ss) employed in this research were students enrolled in Grade 8 French courses in the London Public School System who took part in a four-day excursion to Quebec City. Prior to the trip, and before any testing was conducted, the students and their parents met on three separate occasions with organizers of the excursion to obtain a general orientation, view slides, and gather information about the proposed trip. During their four days in Quebec students lived in a large hotel, stayed together as a group, and took part in a number of guided tours.

Materials

Two similar questionnaires were designed for this study, one to be completed prior to the trip, and one to be completed after the trip. Each questionnaire contained sections concerning personal experiences, stereotype assessment, and attitude assessment. The items in each questionnaire were identical except for those contained in the section dealing with personal experiences. The three sections are described below.

Personal Experience Section. The Personal Experience Section of the questionnaire administered prior to the excursion included the following two items:

1. How do you expect to benefit from the trip?
2. Have you ever visited Quebec City before?

The students were requested to provide, in their own words, answers to the first question, and to respond to the second one by simply checking the appropriate alternative, "yes" or "no".

The questionnaire administered after the excursion included the following items:

1. Did you have much opportunity to use your French in Quebec City?
2. Would you visit Quebec City again if you had the opportunity?
3. Do you think you benefited from the trip? If yes, in what ways?
4. Do you think a similar trip should be organized for Grade 8 students next year?

For each of these questions, the students simply checked “yes” or “no” in the appropriate section. Students who checked “yes” for the third question were requested to explain how they had benefited from the trip.

As stated above, two questions [item 1 in the pre-trip questionnaire, and item 3(b) in the post-trip questionnaire] required free response answers. In coding the responses to these questions, four categories were used, Language Experience, Geographic Experience, Cultural Experience, and Non-Specific Experience. The category Language Experience, subsumes answers referring to improving one’s command of French, learning the language, practicing the language, etc. The category, Geographic Experience, included responses such as learn about Quebec, learn about Quebec City, and learn about a French Canadian city. The category, Cultural Experience, referred to answers such as learning about the French Canadian way of life, French customs, and French (Canadian) history. The final category, Non-specific Experience, included a number of responses which did not seem classifiable in any one large group. It subsumed answers such as, to enjoy myself, to learn something (unspecified), to travel and the like. The analysis of these two questions made use of these four categories of answers.

Stereotype Assessment Section. In both questionnaires, the students were asked to rate the concepts English Canadians and French Canadians along 30 semantic differential scales (Osgood, Suci, & Tannenbaum, 1957) and to rate the concepts Quebec City, My English Course and My French Course along 23 semantic differential scales. The order of the concepts presented in this section and the order and the direction of scales were randomly varied to control for order effects.

Attitude Assessment Section. This section consisted of two parts. The first part contained items from five attitude scales (see 1-5 below) presented in a fixed random order. The students indicated their responses on a seven alternative Likert scale. The second part was formed from items from two motivational scales (see 6-7 below) presented in a fixed random order. These items were presented with their answers in a multiple choice format. The seven scales in this section were:

1. Attitudes toward French-speaking people. This scale, adapted from Gardner and Lambert (1959), is comprised of 10 positively worded items and is designed to assess attitudes toward French-speaking people.
2. Attitudes toward learning French. This scale was designed for this study and consists of 10 items designed to assess attitudes toward learning French.
3. Anomie (Srole, 1951). The ten items comprising this scale were adapted from Gardner and Lambert (1972). The scale presumably assesses the degree of potential dissatisfaction with one’s role in his own cultural community.
4. Integrative Orientation (Gardner & Lambert, 1972). This scale includes 5 items and was designed to assess the degree to which an individual’s desire to learn a second language is based upon a desire to meet and interact with members of the other language group.

5. Instrumental Orientation (Gardner & Lambert, 1972). This scale consists of 5 items and is designed to assess the degree to which an individual's desire to learn a second language is based upon the utilitarian value of second language achievement.
6. Motivational Intensity. This scale was adapted from previous research (Feenstra & Gardner, 1968; Gardner & Lambert, 1959). As employed in this study, it consisted of 9 items designed to assess the degree of effort actually expended in learning the second language.
7. Desire to Learn French (Feenstra & Gardner, 1968; Gardner, 1960). This scale is comprised of 11 items and is designed to assess the expressed desire to learn French.

Procedure

At a meeting outlining the arrangements for the trip, 434 students completed the pre-trip questionnaire. Approximately one month after the trip a sample of 211 of these students completed the post-trip questionnaire during their regular school classes.

Results

Personal Experiences

On the pre-trip questionnaire with respect to the question asking how they expected to benefit from the trip (Question 1), 38.7% of the responses referred to expected language experiences, 16% highlighted geographic experiences and 39.2% emphasized potential cultural experiences. Only 6.1% of the responses indicated non-specific reasons. The responses to Question 2 indicate that only 18% of the students had been to Quebec City previously, though this figure may be somewhat low since 7.6% of the students failed to answer the question. Nonetheless, it is clear that substantial number of students had not in fact visited Quebec City before.

On the post-trip questionnaire, in response to Question 1, 73% of the students indicated that they had had an opportunity to use their French skills in Quebec City, while 25.1% of the students did not. This latter figure may seem somewhat disconcerting but it should be noted that only 38.7% of the responses indicated in the pre-trip questionnaire that the students expected to gain experiences in French, hence, the finding that 73% of the sample reported some opportunity to use the language is an encouraging sign. Despite their prior misgivings, it would appear that the trip did in fact motivate a large percentage of the students to use their language skills even though they were not predisposed to do so.

The responses to Question 2 indicate that 97.6% of the students would return to Quebec City if they had the opportunity. Such unanimity speaks well of the educational value of the trip. A similar conclusion is suggested by the responses to Question 3(a) and Question 4. Approximately 94% of the students felt that they had benefited from the excursion while only 4.3% felt that they had not. Similarly, 89.6% felt that a similar trip should be organized for students next year.

The ways in which the students felt they had benefited from the trip [Question 3 (b)] have been categorized in the same manner as were the expected benefits derived from the questionnaire administered before the excursion. Of particular interest is the fact that whereas "cultural experience" was perceived initially as of equal importance to "language experience", it was viewed, after

the excursion, as the predominant benefit. It would appear that the benefits which accrued from the trip met or surpassed the expectations of the students, and that the major benefit was the tremendous cultural impact which the trip had upon them. Taken as a group, these results clearly suggest that the excursion did have some of the effects anticipated by the educational authorities, viz., an appreciation of the way other people live. It remains to be seen, however, whether the excursion did serve to modify the students' stereotypes or attitudes.

Stereotypes

To determine the students' stereotypes, that is the consensual reactions of the students, toward the concepts English Canadians, French Canadians, Quebec City, My English Course and My French Course, polarity analyses (see

TABLE 1
STEREOTYPES ABOUT THE FIVE CONCEPTS

<i>English Canadians</i>		<i>French Canadians</i>	
<i>Pre-trip</i>	<i>Post-trip</i>	<i>Pre-trip</i>	<i>Post-trip</i>
modern	modern	cheerful	artistic
athletic	athletic	friendly	pleasant
likeable	ambitious	pleasant	cheerful
friendly	likeable	kind	kind
intelligent	proud	good	likeable
pleasant	friendly	artistic	friendly
kind	cheerful	ambitious	loyal
cheerful	intelligent	likeable	good
sincere	pleasant	loyal	ambitious
industrious	loyal	considerate	polite
<i>Quebec City</i>		<i>My English Course</i>	
<i>Pre-trip</i>	<i>Post-trip</i>	<i>Pre-trip</i>	<i>Post-trip</i>
enjoyable	interesting	important	educational
interesting	enjoyable	educational	organized
exciting	exciting	necessary	important
valuable	pleasant	useful	necessary
pleasant	artistic	valuable	valuable
satisfying	likeable	good	meaningful
good	valuable	organized	acceptable
friendly	important	acceptable	informative
nice	good	meaningful	progressive
important	satisfying	rewarding	rewarding
<i>My French Course</i>			
<i>Pre-trip</i>		<i>Post-trip</i>	
educational		educational	
important		important	
useful		valuable	
acceptable		useful	
valuable		rewarding	
meaningful		necessary	
good		meaningful	
informative		acceptable	
rewarding		progressive	
necessary		informative	

Gardner, Wonnacott, & Taylor, 1968) were computed upon the semantic differential ratings made by the students prior to and following the trip. Table 1 presents the 10 attributes most consensually ascribed to each concept by the Ss at each testing.

The results indicate that the students' stereotypes toward these concepts were not greatly affected by the excursion. A verbal description of the stereotypes would seem superfluous; however, two generalizations are worthy of note. Firstly, all of the stereotypes are positively evaluative. That is, all of the stereotypes contain positive attributes such as friendly, pleasant, intelligent, kind, good, and loyal. Secondly, there was very little change in the stereotypes as a result of the excursion. This lack of change may be interpreted in a number of ways. It might be argued that any information derived from the trip would not necessarily be relevant to perceptions of the concepts English Canadians, My French Course, or My English Course. Furthermore one might argue that the perceptions of French Canadians held by students in London, Ontario, are based upon information derived from the mass media (cf., Kirby & Gardner, in press), and, as such these perceptions would not be altered by a short visit to another locale. It does seem unusual, however, that perceptions of Quebec City would not change as a result of the trip since 74% of the students involved indicated that they had never visited the city prior to the excursion. It is possible that either the scales employed to measure reactions to the city were not appropriate, or that the students derived perceptions of the city via the mass media and, again, the trip was of such limited duration that information contrary to their initial perceptions was not obtained.

Attitudes and Motivation

Correlated t-tests were computed on the seven attitudinal and motivational scales. The scales measured attitudes toward French Canadians, attitudes toward learning French, anomie, integrative orientation (toward learning French) and instrumental orientation (toward learning French), motivational intensity, and a desire to learn French. A summary of these tests is presented in Table 2.

TABLE 2
SUMMARY TABLE FOR CORRELATED t-TESTS

Variable	Pre-Excursion Means	Post-Excursion Means	t
Attitude toward French Canadians	54.11	57.73	-6.01 **
Attitude toward learning French	55.11	55.32	- .33
Anomie	40.34	40.31	.04
Integrative Orientation	28.14	28.88	-1.87 *
Instrumental Orientation	22.44	22.93	-1.40
Motivational Intensity	29.88	29.93	- .20
Desire to learn French	19.65	19.46	.94

* $p < .10$
** $p < .001$

Only for the scale assessing attitudes toward French Canadians were significant differences ($p < .001$) obtained. The mean attitude score for the 211 students who were tested both before and after the excursion was 54.11 before the excursion and 57.73 following the excursion indicating that the students' attitudes toward French Canadians became significantly more favorable after the four-day trip to Quebec City, and more importantly this increased positive attitude was maintained for some time after the trip was completed. Other results included in Table 2, reveal an increase in the students' motivation to learn the French language for integrative purposes ($p < .10$), again suggesting the cultural value of the trip. None of the other scales evidenced significant changes.

Discussion

Although the excursion to Quebec City was brief in its duration, and in spite of the fact that the instruments used to measure attitudes and motivation were pilot versions adapted from a larger test development project (Gardner, Bramwell, & Smythe, 1971), modest and relatively enduring changes on the part of the participants were noted. Perhaps the greatest impact of the trip concerns the increase in the students' appreciation of the cultural characteristics of the French Canadian community. This conclusion is based on the large increase in the percentage of responses emphasizing cultural benefits of the trip over those expected prior to the trip. Although an increase in cultural awareness does not, in and of itself, herald an increase in second language acquisition, it does indicate that the excursion was partially successful in terms of the curricular objectives adopted by the London Public School System and probably many other systems.

Other results would seem to present a paradox. Although the trip did not noticeably affect the students on attitudinal or motivational characteristics directly associated with the French instructional program, it did result in more favourable attitudes toward French Canadians and in an increase in their desire to learn the language for communicational purposes. These two changes suggest that the trip served to increase significant aspects of the integrative motive. Since the data concerning changes in cultural awareness also indicate that these students now have a greater appreciation of the French Canadian culture, one would expect corresponding increases in those attitudinal or motivational characteristics directly associated with language acquisition. Perhaps the latter changes require considerably more time.

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Demande de Renseignements à l'adresse du Comité Consultatif du Conseil des Arts sur l'Individu, le Langage et la Société

Le Conseil des Arts du Canada, sur l'avis du Comité de développement de sa Commission consultative des affaires universitaires, a établi le Comité consultatif sur l'individu, le langage et la société.

Ce Comité s'intéressera notamment aux effets que produisent, tant sur le plan affectif que sur le plan de la connaissance, l'acquisition d'une langue seconde, la facilité à s'exprimer dans deux ou plusieurs langues, l'appartenance à un groupe ethnique minoritaire, l'acculturation et la déculturation. En général, il accordera une attention particulière aux activités suivantes:

- A. Etudes linguistiques à composante sociale
- B. Etudes psychologiques à composante linguistique
- C. Etudes sociales à composante linguistique

Le Comité a pour mission d'analyser la situation de la recherche dans ces domaines, d'en déterminer les lacunes et de proposer au Conseil des Arts des moyens de combler ces lacunes.

Pour bien s'acquitter de sa tâche, il est très important que le Comité puisse connaître tous les spécialistes qui oeuvrent au Canada dans les disciplines en cause. La publication d'avis dans des publications comme celle-ci est un des moyens qu'il emploie pour obtenir ces renseignements.

Nous invitons les universitaires dont les travaux se rapportent à la mission du Comité à bien vouloir écrire à:

M. W. H. Coons,
Président du Comité consultatif sur
l'individu, le langage et la société,
Département de psychologie,
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Les répondants sont priés de mentionner leur domaine de recherche, les difficultés rencontrées dans l'exécution de leurs travaux (y compris les difficultés financières), les sujets d'étude méritant une attention particulière, les noms d'autres spécialistes travaillant dans le même domaine, et toute autre chose pertinente.